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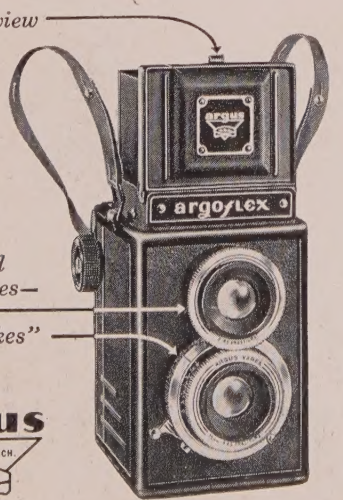

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JUST SEE HOW MUCH MORE THIS PLANE OFFERS YOU

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- ***ELECTRIC STARTER***
- ***TWO-WAY RADIO***
- ***LOW PRICE***
- ***ECONOMICAL OPERATION***

Compare it with any other plane anywhere near its price!

Copyright 1947 Piper Aircraft Corporation

THIS is the plane aviation enthusiasts are talking about today. One of the reasons is that it gives you so much for your money! The Super Cruiser seats three people, yet costs no more than many two-passenger planes. The 100-horsepower engine gives you a top speed of 115 miles per hour. For outstanding utility, the Super Cruiser, at normal cruising, takes you 600 miles on a tankful of gas . . . and at economy cruising, 700 miles!

An electric starter and two-way, two-band radio are *standard equipment* on the Piper Cub Super Cruiser. To start the engine you just press a button on the instrument panel. And with the radio you can "fly the beam," talk with airport control towers, enjoy favorite programs in flight!

Although it brings you these many advantages, the Super Cruiser is a plane you can afford to buy and fly. See your Piper Cub Dealer now for a free flight demonstration, for the full-color literature and the popular books. . . *How to Fly a Piper Cub* and *What Your Town Needs for the Coming Air Age*. Remember—only Piper makes the Cub, that good, safe plane. Piper Aircraft Corporation, Lock Haven, Penna., U.S.A. . . . In Canada: Cub Aircraft Corporation, Ltd., Hamilton.

LOOK TO THE LEADER FOR GOOD SAFE PLANES YOU CAN AFFORD TO BUY AND FLY

PIPER

Vol. 6. No. 2. February, 1947. SKYWAYS is published monthly by Henry Publishing Company, 444 Madison Ave., New York 22, N. Y. Printed in U.S.A. Single copy, 25 cents. Subscription Prices: U.S., possessions, Canada and Pan-Am. Union, $7.00 for three years, $5.00 for two years, $3.00 for one year; all other countries, add $1.50 per year for postage. Three weeks required for address changes (give both old and new address). Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited material. Entered as second-class matter Sept. 30, 1942, at the post office at New York, N. Y. under the Act of March 3, 1879. Copyright 1946 by Henry Publishing Company.

The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

Got a couple items here you ought to know about.

First one's about a trip from Boston to Dayton by one of the airlines. They piled all the furnishings of a house into a plane for the hurried journey. Then threw in the house! A pre-fab. job it was, complete with porch.

Another bit we like: One of the biggest manufacturers of warplanes—they turned them out by the tens of thousands during the war—is keeping the wolf away by *subcontracting* for three putt-putt makers!

And the P-80's are so fast that a heavy rainstorm can scratch and nick wings to the tune of a 15 mph loss in speed!

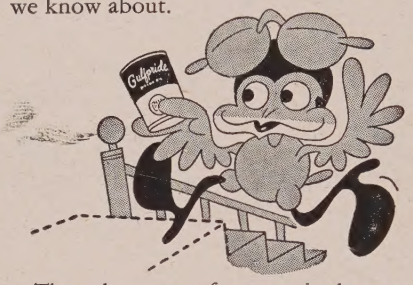
Aren't we in a wonderful business, fellas?

WATCH YOUR STEP

We've been hearing about a wonderful extra step.

You add this extra step to the top of a flight of stairs. Then when you get to the top of the stairs in the dark, this extra step prevents you from putting your foot down on thin air!

That makes two wonderful extra steps we know about.



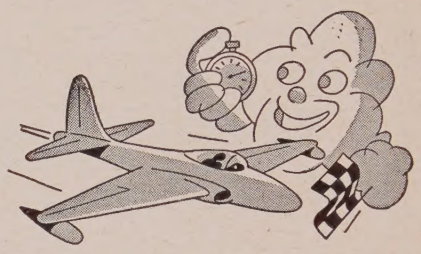
The other one, of course, is the extra step we add to the "top" of the refining when we make Gulfpride Oil. We call this extra step the "Alchlor Process," and what it does is to get extra of the unstable molecules out of the oil, leaving fewer carbon and sludge makers.

And because of this extra step, Gulfpride Oil is extra tough and rugged and prevents your pistons from coming down on thin air!

LITTLE KNOWN FACTS DEPT.

"GERMAN planes with AMERICAN engines were used by the BRITISH against the ITALIANS in AFRICA!"

Lt. Peter M. Bowers, Wright Field, goes on to prove his Little Known Fact About Well Known Planes with: "The RAF requisitioned Junkers Ju-52's with P&W R-1690's from South African Airways to use as transports, early in the Libyan campaign," thereby adding a commission as "Perch Pilot (bottom rung)" to the "1st. Lt., Air Corps" he already has.



And G. Grahame Duce, Baltimore, gets a commission for this Little Known Fact (with proof!):

"Compressibility was encountered in the Army's P-3 of 1928 at a speed of only 110 mph! (The exposed radial engine cylinders were responsible.)"

. . . and another "Fact":

"When the plane travels 550 mph, air passes over the thickest part of a P-80 wing at 650 mph!"

That means that with 3 more acceptable (and proved!) Little Known Facts, Perch Pilot (br) Duce will become a Senior Perch Pilot!

You too?

Just mail us your "Facts"—and proof—and you may win one of the most precious commissions since the birth certificate was invented.

Address above.

Gulf Oil Corporation and Gulf Refining Company...makers of

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PILOTS, ATTENTION!

You've still got time to make the Sixth Gulf Air Tour to Florida, January 2 to January 26. All you need is a plane, the desire, a map, and an application which you can get from Gulf airport dealers.

AND IF YOU'VE GOT 125 HP (or less) THE GAS AND OIL ARE ON GULF! FREE!

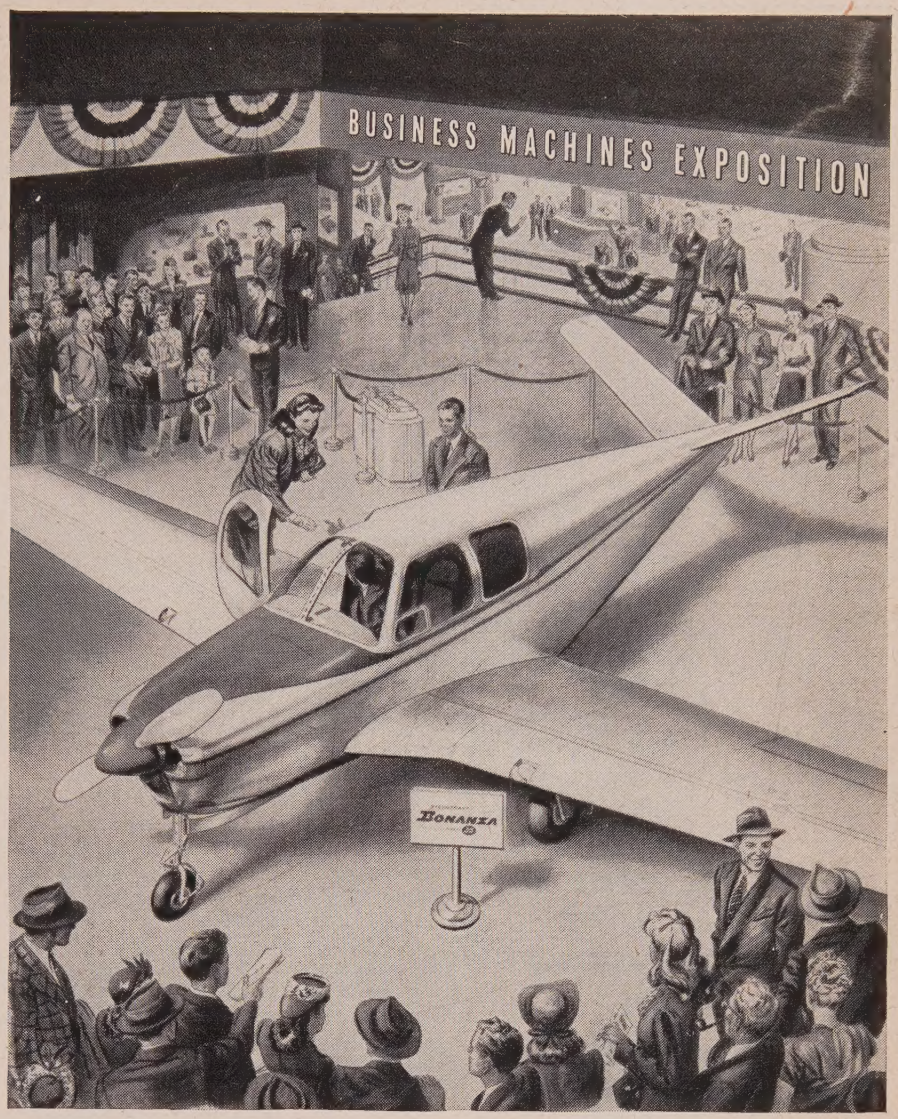
This is our contribution to the advancement of private aviation. See you in Florida.

AL WILLIAMS

Speaking of better business machines

Look at the Beechcraft

BONANZA

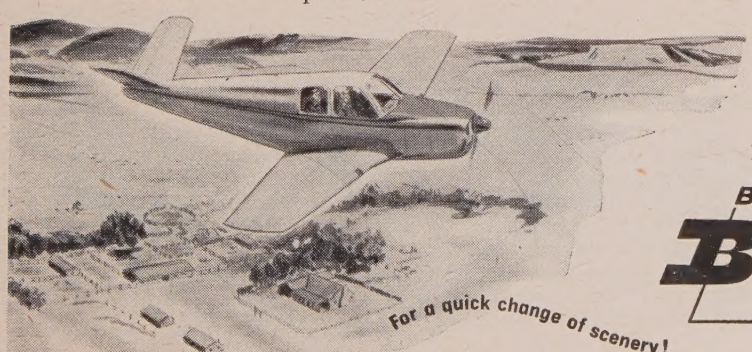


• *Top Speed, 184 mph; Cruising Speed, 175 mph; Landing Speed, 46 mph; Range, 750 miles*

WHAT'S a business machine for? To save time, save labor, save money, improve a product or service. The Beechcraft Bonanza qualifies as one of the most useful, efficient and economical business machines ever presented to American industry! And it not only does superlatively well the things required of a good business machine, but makes a new kind of executive out of the business man himself!

The Bonanza is a four-place, 175 mph business vehicle that brings travel costs to as low as one cent per passenger mile while providing limousine luxury and comfort to every passenger. You go when you want to go—in *any* direction. The plane is equipped for round-the-clock, round-the-season travel—two-way radio, landing lights, instruments, cabin temperature control. And it is as quiet as an open car on the road at 55 mph!

The Bonanza *had* to be a revolutionary plane to provide the utility demanded for business use. It *is* revolutionary, achieving a speed and payload with its 165 hp engine and controllable propeller that no other plane has ever achieved before with less than 330 hp! Yet for this business machine—capable of saving thousands of dollars per year in man hours and executive efficiency and of making substantial savings in travel expense—the cost is just $7,345 F. A. F. Wichita, Kansas.

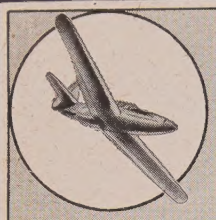


Production for early 1947 is already sold. Orders for delivery will be filled in the sequence received. There is a Beechcraft distributor near you, ready with additional facts and figures—and a Bonanza. Write for his name. Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

BEECHCRAFT

BONANZA

MODEL 35



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FLY TO IT!

Year 'round air transportation is a natural for the man with license to hunt, fish, fly

AN EDITORIAL

THAT mountain stream you have been dreaming about—where rainbow trout lie in wait to flash out and snatch your lure—is no farther away than tomorrow. You are tied to a desk, and a long week end at home is the most you can see in the way of relaxation? Maybe a game of golf if the weather is fine, or a drive in the country—but actually the same old places and the same old faces are the only things on the horizon.

Well there are other answers. How would you like to go skiing in New Hampshire or Sun Valley? How would you like to take a Seven League Boot jump into the deep woods of Canada and stalk a moose? Those antlers would look mighty fine mounted and hung above the family fireplace, wouldn't they? No we aren't dreaming—it's still midwinter in New York and there are snow flurries blowing outside the window. But we know a lot of places where the air is balmy and the big ones—swords, sails, and sharks—are sliding through tropical seas that show a deeper blue than the crystal clear skies overhead. Where a man can lounge on a boat deck with his feet against the stern—until the biggest one of all strikes the bait and a battle royal is on. The moment of all moments, that's it—when you reel him in, inch by painful inch, until finally, he's done and boarded. After that, it is just a little matter of weighing and measuring back at the wharf, and, of course, getting a picture snapped for home consumption.

Why should we whet your appetite by talking about these things you'd like to do but can't? Millionaires can take trips like that—but not you on your middle class income. That's where you're wrong. You can. Suppose you own an airplane—just an ordinary puddlejumper. There are mighty few places in the United States where that little plane of yours won't carry you to happy hunting or fishing grounds in a matter of three or four hours, or less. And there are mighty few places where there isn't some sort of a cow-pasture airport where you can land and tie down, while you spend the rest of that long week end blissfully sloshing around in hip boots and a flannel shirt, realizing that life is good and a man is no longer lashed to a few square miles.

If you don't own a plane but do have your private pilot's ticket, you can rent one. Or, maybe you don't have that ticket but do have the cash to hire plane and pilot both, That's fine, particularly if you want to get to some of the more inaccessible places. But the airlines also go into every section where there is good hunting and fishing. They will get you there and back in a hurry. There are even parts of the country where they are running special sportsmen trips and you don't have to pay extra for your gear. And, if you can spend a week or two, there is almost no place on God's green footstool where you can't roam in search of fantastic sports' delights and still get back in time for your Board meeting a week from next Monday.

The reason we're bringing all this up now is that beginning with this issue, SKYWAYS is going to carry a FLYING SPORTSMAN Section. We are planning to tell you why, where, when and how. You can flip the pages to it, and in a moment's time find out just where you can fly tomorrow, what you will find there that will interest you, and what you have to do to get hunting and fishing licenses and other such essential items. This is one of the best antidotes there is to being a Sunday airport pilot, if you are one. You can learn cross country flying and have a whale of a good time, all in the same attractive package. Lots of the States are so anxious to have you visit them that they are offering all sorts of inducements to come. As far as going over the borders is concerned, Government officials down in Washington are working like beavers right now to get the red tape cut so that before too long all you'll need will be a tourist permit and you can go anywhere in the Hemisphere. We'll keep you informed on the progress of that project, too. As a matter of fact, flights into Canada no longer require passport.

Western Airlines, which uses the slogan "Skyway to the Nation's Playgrounds," serves a majority of all the national parks and resort areas from Canada to Mexico, and from the Canadian Rockies to the Pacific Ocean. In winter one may fly the entire western ski circuit. Sun Valley; Alta, Utah; Banff, Canada; and Aspen, Colorado, are only a few of the famous winter sports areas easily accessible by this airline. The Sun and Fun country which includes Death Valley and the Casinos of Las Vegas, is a sportsman's winter paradise. Western also serves pheasant hunters in South Dakota, big game hunters in Wyoming, and deep sea fishermen in San Diego.

If you are a pilot, we don't need to tell you that the private ticket in your wallet is the answer to going places faster, or having more time to spend where you want to, when you get there. If you are an arm chair aviation enthusiast, then it's the chartered plane or the airline that will work the same old magic for you. It doesn't require an inexhaustible bank balance to take in a wider sweep, and make your life a lot richer. Airline travel is often less expensive than Pullman and you spend hours instead of days en route. Maybe this sounds like old stuff but it needs to be told and retold, because we're all too apt to get into ruts and start thinking certain things are impossible. SKYWAYS is going to give you the most pleasant needling you've ever had from now on to wake you up and get you out of those ruts. We hope to show you short cuts to becoming a FLYING SPORTSMAN.

J. FRED HENRY

More Get-up More Go More Fun

WITH AN AEROMATIC* PROPELLER ON YOUR OWN PLANE

TAKE-OFF: With engine at full throttle, Aeromatic Propeller assumes low pitch automatically . . . gets plane off ground quickly, allows use of full take-off power.

CLIMBING: Aeromatic responds to natural forces . . . increases pitch automatically as air speed increases . . . gets plane to cruising level fast . . . on minimum fuel.

CRUISING: Aeromatic automatically maintains the most advantageous pitch . . . for top cruising performance on minimum fuel at any level up to critical altitude.

LANDING: Aeromatic adjusts its pitch automatically for a long flat glide . . . moves to low pitch instantly for a quick pickup if the pilot overshoots the field.

ONE-FOURTH SHORTER TAKE-OFF RUN! One-third higher rate of climb! Greater cruising range and speed! All with less fuel consumption, less engine wear! That's what you get from Aeromatic—"the propeller with a brain."

IT'S COMPLETELY AUTOMATIC! The Aeromatic Propeller is completely self-acting and self-contained . . . varies its own pitch automatically for peak performance all the way. There are no extra controls to "fiddle" with . . . no extra instruments for the pilot to watch.

WRITE FOR INFORMATION! If you own a new plane or plan to buy one, enjoy the extra advantages of an Aeromatic Propeller. Write to your aircraft manufacturer and see if you can have an Aeromatic on your plane. Or drop a line to: Koppers Co., Inc., Aeromatic Propeller Dept., 272 Scott Street, Baltimore 3, Maryland.

Custom-Tailored for the Planes they Fly

Aeromatic Propellers are available for most new private planes and are being installed on other makes and models.

The Propeller with a Brain for Your Private Plane

Aeromatic

Air Controlled Automatic Propeller

Licensed under patents of Everel Propeller Corp.

*Reg. U. S. Pat. Off.

KOPPERS

HANGAR FLYING

LOCKHEED

Hummingbirds vs. Constellations

Hummingbirds, who hold the record, can fly 600 miles without refueling. And it doesn't take a John J. Audubon to figure out that hummingbirds are probably pretty tired cookies when they land. But the *Constellation*, no slouch itself when it comes to records, can now fly more than 4000 miles nonstop without even breathing hard—thanks to its new long-range wing.

The wing adds about a thousand miles to the plane's range. An extra tank inside each of the two outer wing panels increases gasoline capacity by over a thousand gallons—with a weight

increase of only 600 pounds (exclusive of the gas, of course).

And, according to certain cabalistic signs which engineers love to make on graph paper, the payload of such *Constellations* is doubled in the latter stages of a flight. Money in the bank.

Adding another thousand miles to the long-range *Constellation* may sound like gilding the lily. If that's what it is, Lockheed spends an important part of its time lily-gilding—constantly making the *Constellation* a better plane. And making better hangar flying, too.

L to L for L

© 1947, Lockheed Aircraft Corp., Burbank, Calif.

WASHINGTON NEWS

BY ALICE ROGERS HAGER

THERE have been a lot of stories about ways for GIs to beat the housing shortage but it has taken a Lovettsville, Virginia, vet to come up with the most unique. J. Graham Spring, ex-USAAF bombardier and prewar private pilot, had a perfectly good home in his sleepy Virginia town but he wanted to go to college in Washington. There weren't any houses to be had in the Capital, so Spring did a little fast thinking and came up with the answer. He bought a surplus Taylorcraft; found himself a nearby small airport where he could park and is quite contentedly commuting—by air—daily to his classes at George Washington University. What's more, he's gotten a lot of the other GW students excited about the whole idea and he's started a flying club at the university which is raising funds to buy a plane of its own. It takes young Spring just 40 minutes each way to do his commuting—with half of it spent riding the bus to the airport.

Weather difficulties of the airlines may be finally solved by the experiments now going on under the cooperation of the Army, Navy, CAB, CAA, ATA and ALPA at Arcata, California. Only the Aleutians and some parts of England are foggier than Arcata, yet, daily, using unified landing aids (lights, fog dispersal equipment, electronic devices and new ground control radar) planes can be brought in a few minutes after the equipment goes to work on runways that were completely obscured.

Major-General Hsi-Lin Hsu, Chinese Surgeon General, and a staff of Chinese Army surgeons have been touring Army Air Force medical installations and schools, studying AAF methods. Chinese army medicine was largely notable for its absence during the war but the country has some fine surgeons, most of them trained either in the U.S. or in Europe. It is one of the few really bright spots in the dark picture of that great land that its chief medical officers will come to us now to learn new ways of caring for their ill and wounded.

Want to see the atomic bombs drop on Hiroshima, Nagasaki and Bikini in your own school or club auditorium? Want to watch paratroopers and supplies hurtle out of AAF transports, and postwar spraying of DDT over disease-ridden areas? "AAF Special Delivery," an official film of air transportation in war and peace, can now be borrowed for educational purposes from the U.S. Office of Education through the distributors, Castle Films, 30 Rockefeller Plaza, New York City, at cost.

Here's a break at last for those of you who were flight officers during the war. More than 2,050 former FOs have already been recommended to the AGO for appointment in the Air Corps Reserve. Under the new AAF policy any of you so recommended are eligible for Second Lieutenant's commissions. Over 7,400 applications have been received but those of you who haven't applied, can write the AGO's office, War Department, Washington, for your application forms for Reserve appointments. AAF says: "Recommendations for appointment are made by AAF upon receipt of records from the AGO."

Whether you voted for the Elephant or the Donkey to run the country during the next two years, if you have followed the political side of aviation for any time, you cannot help but feel that defeat of two men in this election was a tragedy. Jennings Randolph, who for 12 years had fought valiantly for every important aviation measure to come before the Congress and who had introduced many of the more urgently needed Bills, lost his West Virginia seat by a margin of a few hundred votes. His many friends and the

(*Continued on page 87*)

SKYWAYS

Incorporating Air News

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There are two Skyways: English and Spanish

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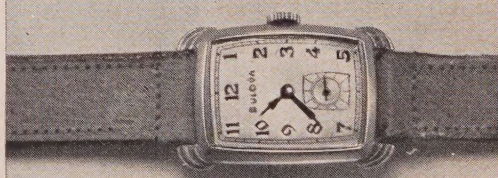
It's 5 P.M.
B·u·l·o·v·a
Watch Time

BULOVA

Official Timepiece of
AMERICAN AIRLINES!

America runs on Bulova time! Yes, throughout this vast land of ours—in cities, in towns, in villages, on farms—even at sea and in the air—people schedule their daily lives by Bulova Watch Time. For, More Americans tell time by Bulova than by any other fine watch in the world.



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BULOVA time

AIR YOUR VIEWS

Jato vs. Ratog

Gentlemen:

May I offer my late congratulations on the many interesting items on the September "Military Aviation" page.

Maybe you could let me know why the AAF calls the system by which aircraft are helped off the ground by some means of rocket-propelled apparatus, "JATO." I believe the British are more accurate in this respect, when they call their system "RATOG," which means "Rocket-Assisted Take-Off *Gear*" and not "Rocket-Assisted Take-Off *from Ground*."

GABRIEL TASCHEREAU

Quebec, Canada

There is no doubt that the British term RATOG is more strictly accurate than JATO, but in a broad sense JATO is correct, in that a rocket is one form of jet power. Of course you are right in the final G of RATOG standing for "gear" rather than "ground."—ED.

•

Classes For Lasses

Dear Sirs:

Could you possibly give me a list of aeronautical schools that have classes for girls. I am interested in flight training.

GAE EGAN

Forest Hills, L. I.

Nearly all flight schools are coeducational. You can get a list from your local CAA office.—ED.

•

We Like Him, Too

Dear Sir:

My husband started at Wright Field when he was 16, and is now 42. He remarked that he would like a subscription to SKYWAYS for Christmas, as he likes it best. Knowing his experience—he has tested a good many engines since he has been there—I thought this quite a compliment.

MRS. SARAH WILLIAMS

Del Paso Heights, California

•

Eggbeater, Not a Windmill

Gentlemen:

In the photographic review of French aircraft in the November issue, there appears a photo of a ship designated a helicopter, though the machine shown is unmistakably a development of the familiar direct-control autogiro.

As a private pilot, looking forward to a "windmill" of my own, I consider it unfortunate that the autogiro has been discarded in this country in favor of the more spectacular helicopter. The greater simplicity and ease of control of the autogiro would seem to merit a continued place for it in research toward the ultimate personal aircraft. The family pilot will gladly relinquish the hovering and backward flight of the 'copter for the stability and simplicity of the 'giro. He can enjoy the same wide speed latitude as the 'copter pilot, landing and taking off in the same back yards, but incurs less fatigue on his trip. SNCA designers at Sud-Est are evidently continuing autogiro development for well-considered reasons.

A. G. VANALSTYNE

Hollywood, California

You undoubtedly have an argument there, Van. We'll look into the matter and see if we can get any answers for you. And we stand corrected; it is an autogiro.—ED.

•

Strictly Speaking

Dear Sir:

In the August SKYWAYS, Col. Shoop ("I Fly By Jet") said that the P-80 *Shooting Star* travels at 640 mph. Yet England's *Meteor*, which travels at 616 mph is supposed to hold the world's speed record.

J. WEWECE

Johannesburg, South Africa

In the first place, that 640 mph figure was made coming out of a dive, which doesn't count. In the second place, to hold a record officially, *a plane must make the speed on a measured course on an average compiled from four runs (see "Sky Speedway" in the January SKYWAYS). And in the third place, England's* Star Meteor *not only "is supposed to" hold the world speed record, it actually does!*—ED.

•

An Auto Fan!

Dear Editor:

On page 21 of the November issue ("Never Too Old to Fly"), the caption under the top picture says Montee is stepping from his Buick. The car is *not* a Buick but a 1924 Studebaker.

ERIC JOHNSON

Cleveland, Ohio

We checked with a Studebaker friend of ours, and found that you are right. But we'll bet that same friend couldn't tell a Jenny from a D.H.4. Can you?—ED.

•

Information Please

Dear Sirs:

Can you tell me where I can get information concerning schools or colleges for aerial photography? I have a very good booklet titled "Practical Aerial Photography" which I ordered from your classified advertising columns.

W. PENTZ

Dubois, Pennsylvania

According to one of the major aerial photography companies, most industries train their own aerial photographers—at least, they train those who have not already been trained in some branch of the services. Many colleges have photogrammetry courses, but even these are primarily concerned with mapping, and the developing and printing of the film rather than actual photography in flight. It would seem that your best bet is to take courses in fundamental photographic techniques, and then learn aerial photography by going up and doing it!—ED.

•

Altitude Record

Gentlemen:

You stated (Dec. SKYWAYS) that the altitude record is held by an Italian named Col. Mario Pezzi. I believe it is held by two Americans named Anderson and Stevens, who reached 72,394.8 feet in 1935.

BOB THEER

Bristol, Connecticut

If you'll read the letter again, Bob, you'll see that we were speaking of heavier-than-air craft. Anderson and Stevens did reach the height you mention—but in a free balloon.—ED.

•

Not Secret Now

Dear Editor:

Your December issue is by far the best I've seen. But on page 42 you show the XB-44, not the B-50 as you state. The B-50 is still on the secret list to the public. Am I right?

MYRON NATHAN

The Bronx, New York

The B-50 is the production version, with refinements, of the experimental XB-44. The B-50 was released to the public last spring.—ED.

•

Jet Lightplane

Dear Sirs:

Does the jet-propelled lightplane pictured on pages 24 and 25 of your November issue actually exist, or is it merely a figment of some retouch-artist's imagination? If it actually does exist, I would appreciate more information on it, as it is the first of its class that I have seen.

ALLAN FORSYTH

Exeter, New Hampshire

You'll have to wait a while for that one, Allan. Although that plane, as such, does not exist, we'll confess that rumors and sketchy data regarding a jet-propelled lightplane motivated the picture.—ED.

•

Photo Info

Dear Sir:

Would you be so kind as to find me about three or four pictures each of the latest and most modern Navy aircraft carriers, bombers, and seaplanes? Send them no larger than 10 inches, and colored if possible. I do not doubt but what the Navy Department could get these for you. These pictures are wanted for a serious hobby of mine. I have some very fine Navy pictures already, which have been cut out of SKYWAYS recently.

JOHN TOMASHESKI

Minonk, Illinois

So many of you have written in asking for pictures we feel a word of advice is necessary. There are several agencies which supply pictures to collectors at a slight charge. Also, you might write to the manufacturer. Of course, you know you may order the Air News Yearbook from SKYWAYS—it is crammed full of good pictures of airplanes, both American and foreign. We're very much in favor of hobbies, and would like to help wherever we can. Unfortunately, we have no facilities for distributing pictures, other than the Yearbook.—ED.

PAC DEALERS AND CUSTOMERS GET EXPEDITED SUPPLIES

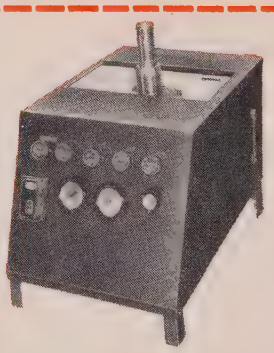
AUTHORIZED PAC SALES AND SERVICE

The national shortage of aircraft supplies has become so acute that PAC has placed extra expediters in strategic parts of the country.

These men are traveling thousands of miles for the sole purpose of assuring *you* the fastest and most complete aircraft-supply and aircraft-maintenance service.

Through PAC, *and only through PAC,* you can be sure that every possible effort is made to get you *all* needed parts, supplies, and service in the shortest possible time.

First National Aviation Service Organization • PAC has more than 100 dealers and distributors—the number is increasing every day—backed by 9 major company bases stretching from Mexico to Alaska. Watch for the PAC sign at your airport—It's a Good Sign for Flyers.



Portable Hydromatic Propeller Test Stand • This is one of the specialized types of equipment designed and built by PAC for propeller repair and maintenance work. This PAC-built equipment is in service at many military and airline bases. Information and literature is available on request.

PAC

PACIFIC AIRMOTIVE corporation

Executive Offices: 6265 San Fernando Road, Glendale 1, California

NENE JET installation on Nene-Lancastrian explained to RAF group by test pilot

MILITARY AVIATION

Mixed Power Plants

THE recent test flights of the *Nene-Lancastrian* (Avro *Lancaster* four-engine bomber with the two outboard Rolls-Royce *Merlin* V-12's replaced by two Rolls-Royce *Nene* turbojet engines) is an extension of the flying test-bed technique which proved so useful in the early development of turbojet units. The *Nene* ranks with the de Havilland *Ghost* as the most powerful turbojet now in production anywhere, both being rated in the 5,000 pounds of thrust category. This "Jet-castrian" installation is exceptionally clean, and the objectives are to accurately assess, with a comprehensive range of technical apparatus installed in the airplane, the efficiency of the power plant in flight, and also to investigate the performance of jet units when installed in heavy aircraft. In addition to this, the combined static thrust of 10,000 pounds delivered by the two *Nenes* boost the speed of the *Lancastrian* from 300 to 350 mph. In flight all four engines are used in take-off and climb, and when cruising altitude is reached, the *Merlins* are shut off, props feathered and the jets take over. Full cruising speed can be maintained as the jets are most efficient when going full tilt, and the flight is remarkably smooth and quiet.

Hitherto in the United States such mixed power plants have been used in fighters and bombers powered by "composite" engines. These employ conventional power plants in the nose and turbojets in the tail. Examples include the Ryan *Fireball*, the Douglas XA-26F, the Curtiss XF15C, etc. Somewhat similar are the all-jet Convair XP-81, Ryan XF2R, with turbo-prop in nose, turbojet in tail. Use of the propeller in all of these mixed jobs permits a valuable flexibility presently lacking in the straight jet-powered aircraft. Allied technical intelligence teams found the Germans had many interesting projects, some of them well along, involving mixed power plants. Among them was the Blohm & Voss P-203 bomber with two BMW 801 14-cylinder radials and two Heinkel-Hirth He S 011 turbojets under the wings. The estimated performance was 570 mph at 39,000 feet. Focke Wulf had a big bomber, the Ta 400 (after Kurt Tank, chief engineer-designer) with six BMW 801's and two Jumo 004 turbojets. On the whole it's just as well that this didn't jell a year or two earlier!

Tactical Air Support Rockets

Most of the talk about the possibility of rockets supplementing or supplanting piloted aircraft in a possible future war has been in terms of trans-oceanic guided missiles with atomic warheads taking the place of long-range heavy bombers used as a strategic air force to attack an enemy's capacity to wage war. Such a development is admittedly several years away. However, authorities in charge of field artillery rocket tests at Fort Bragg (NC) during the past year are of the opinion that short and medium range (up to 200 miles) guided missiles will play a very important part in tactical air support operations with ground forces if and when there is another war involving ground engagements. Such projectiles have been developed to an extraordinary accuracy, and have certain characteristics not possessed by tactical aircraft, such as fighter-bombers, medium bombers, night fighters and attack planes. The latter are necessarily limited in their operations at night and in bad weather, while artillery shells with proximity fuses, radar-directed guided missiles and other counter-weapons have made them increasingly vulnerable since the original developme of the Tactical Air Force by the Montgo ery-Coningham-Brereton ground-air team Libya's western desert.

Jets for Speed Record

The next attempt to crack the internation speed record will find several entries whi are likely to give the Gloster *Star Mete* with *Derwent V* turbojets (present holder the 616 mph record) a good run for money. On the British side there will be Gloster development of the *Star Mete* probably powered by two Rolls-Royce *Ne* turbojets (5,000 pounds of thrust ea against the 4,000 of the *Derwent V*). T new Gloster jet plane will have a high Mach number, due to thinner wings a some sweepback. A second model of the Havilland 108 tailless jet plane is e pected to be ready, probably with the *Gho* turbojet (5,000 pounds of thrust), with ce tain improvements discovered in the trials the first model by Geoffrey de Havilla prior to his crash in late September. A thi British contender will be the Vickers-Ar strong Supermarine E 10/44 jet fight powered by one *Nene* turbojet. Anoth *Ghost*-powered dark horse is Sweder "Project 1001" said to be well into the 60 mph bracket.

American contenders will be the Republ P-84 *Thunderjet*, powered by J-35-GE axi flow turbojet with water-methanol injecti booster; Lockheed P-80 *Shooting Star*, po ered by Allison-built J-33-GE radial fl turbojet, similarly boosted; and the Nor American XP-86, with the J-35 GE. carrier-based opposite number is the cently announced XFJ-1). The P-80 had initial speed of 550 mph, since boosted better than 10 per cent; the P 84, a speed 590 mph, already boosted about 4 per cen the XP-86 had a design speed of 625 mp Under favorable conditions, especially in h weather, any or all of these jet fighters c crack the 621 mph (1,000 kilometers) nece sary for a new record. (It must be at le five miles more than the present 616 mp and it must also be an average of four fligh two up-wind and two down-wind). A figu of 630 mph is not at all unlikely, but unfo tunately for American ambitions it is ev more likely for some of the British mode

Air War Histories

Dramatic histories of some of the comb Air Forces and related activities are beg ning to appear. The first of these is entitl *One Damned Island After Another: T Saga of the Seventh* (by Clive Howard a Joe Whitley). This vividly told narrative f lows the Seventh Air Force from Pearl H bor to Tokyo, via the Gilberts, Marshal Marianas and Okinawa. Another book cov the entire story of lightplanes in the w and is called *Jeeps in the Sky* (by Lt. C Andrew Ten Eyck). Several others are preparation under the auspices of the P sonnel Narratives Division, Hq AAF, Lo Island City, including a popularly-writt three volume set to be published by Harp & Brothers during 1947.

To complete the air war picture Harp has also published *The Navy's Air War: Mission Completed*, and will publish a si lar volume on the contribution of Mar aviation to the Pacific victory. N.F

Announcing

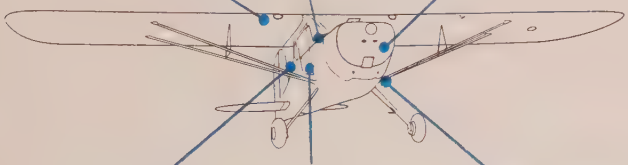
Better-Than-Ever Cessnas for 1947

NEW SAFETY — NEW UTILITY — NEW COMFORT — NEW PERFORMANCE

New Noiseless All-Weather Ventilation System affords airline-type control of fresh air flow into the cabin. No rain can enter in flight or on the ground.

New Shock-Mounted Instrument Panel, with rheostat light control, combines functional design with ultra-modern styling for longer instrument life and greater accuracy.

New Streamlined Cowl Design enhances the smart, clean, modern lines that have always distinguished Cessna styling.



New Foam-Rubber Seat Cushions mounted on no-sag springs afford the utmost in cross-country flying comfort. Seats are adjustable.

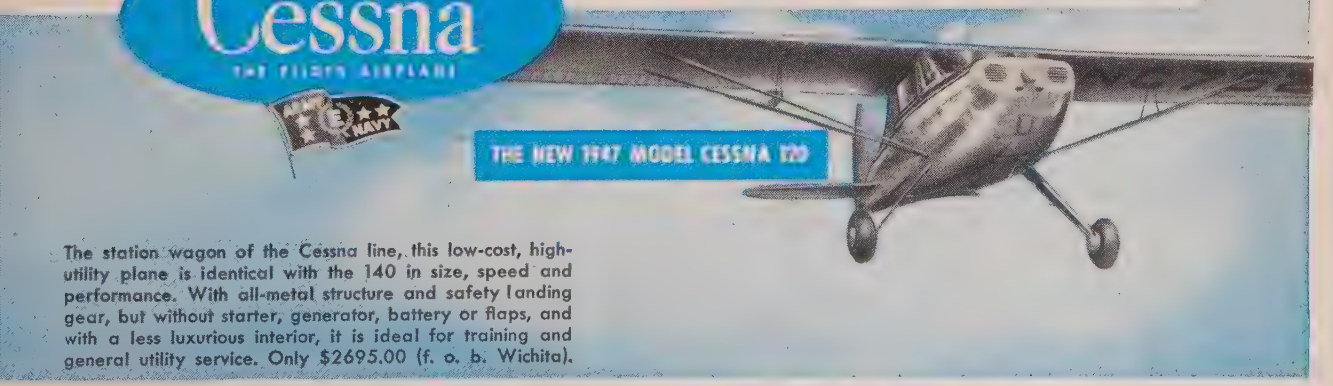
New Interior Cabin Styling is achieved with the very finest quality two-tone fabrics and genuine leather, for greater life and beauty.

New Muffled Exhaust greatly reduces the noise level, outside as well as inside the cabin, permitting normal conversation in flight.

The features shown at the left are a few of the many new innovations that Cessna brings you in the 1947 models. In addition, Cessna offers you longer life, less maintenance and greater safety with its all-metal construction, patented safety landing gear, 80-pound luggage capacity, 450 mile range and a top speed of over 120 m. p. h. Powered by an 85 h. p. Continental engine, the new 1947 model Cessna 140 sells for only $3245.00 (f. o. b. Wichita). See all these features that Cessna alone gives you at your Cessna dealer's now.

CESSNA AIRCRAFT COMPANY,
DEPT. S, WICHITA, KANSAS

Cessna
THE PILOT'S AIRPLANE



The station wagon of the Cessna line, this low-cost, high-utility plane is identical with the 140 in size, speed and performance. With all-metal structure and safety landing gear, but without starter, generator, battery or flaps, and with a less luxurious interior, it is ideal for training and general utility service. Only $2695.00 (f. o. b. Wichita).

SEAGOIN' CRAFT is this twin-engine Cessna—as such, the seaplane is called the Crane. For water handling a rudder control is attached on one of the floats

HANGAR FLYING

Twin-engine Floatplane

LAC du BONNET, MANITOBA (Canada)—An experimental twin-engine Cessna was initially test flown at Lac du Bonnet by veteran test pilot Roy Brown. Dubbed the *Crane*, it was fitted with floats designed by Edo Aircraft Corporation, Long Island (N.Y.) and manufactured in Canada by MacDonald Bros. Aircraft, Winnipeg, Manitoba.

This particular craft was a heavy wing version of the *Crane*, was equipped with Jacobs 225-hp engines, each driving Hamilton Standard two-blade constant speed props. Net increase in weight empty due to float fittings was 443 pounds. As a seaplane, the *Crane* is expected to have a disposable load of 1,446 pounds, which on a 250-mile flight would allow a payload of approximately 850 pounds.

During test the following times and speeds were recorded: Standing start to airborne, 27 seconds; Standing start to 1200 feet, 2 minutes 10 seconds; Initial rate of climb, 700 fpm; and Cruising speed, 120 mph at 22 inches mercury.

The Personal "Company" Plane

WICHITA, KANSAS—In re: the recently certificated *Bonanza*. Though not primarily engineered for the corporation that would like to own a company plane for two or three of its exec's to travel about in, at least with said businesses in mind, it was so devised . . . according to word from Beech Aircraft Corporation. A plane that would be comfortable, luxurious and fast—yet not as expensive as the 11-passenger twin-engine Beech, Model D18.

On the date the four-place *Bonanza* got its Approved Type Certificate from CAA, there were 1500 orders unfilled. Ample proof the *Bonanza* fills the bill for some 'un.

Headin' For the Roundup

SAN ANTONIO, TEXAS—To the tune of "saddle your blues to a flying machine," flying cowboy Raymond Hicks went aloft in a 65-hp tandem to rope a calf at the Texas Flying Farmers airshow meet. Flying low, tailing the calf across the Bandera Airpark, Hicks made several attemps to "dab a loop" on him but, for the most part, the calf ran too low and slow. Though unsuccessful from the cockpit, Raymond later pursued the calf afoot and roped him like any good "cow poke" should.

Can You Top This?

HICKSVILLE, NEW YORK—The prosecuting attorney defending a home owner (who claimed the neighboring air park depreciated the value of a million-dollar estate) harangued before the judge day after day with the presiding judge merely but definitely saying: "Um. Tsk. Nsst." All said with deep sympathy. Finally, the defense counsel was startled to hear the opposing attorney state: "And furthermore the Air Park is in the way of the Great Circle!" And the judge just acquiesced with seemingly heartfelt understanding.

And the Lowly Hotdog Too

TUSCALOOSA, ALABAMA—Dedicated to the happiness of the private flyer is Dixie Air, Inc. located at Van De Graff Field. They provide complete plane service, offering hotel accommodations right on the field for the air traveler or private flying enthusiast. The accommodations include a modern restaurant serving all the way from the "lowly hotdog" to full course dinners.

Plans for a seaplane base are aided and abetted by the close proximity to the Black Warrior River, only a mile from the field. Tie down is for free—there are no landin or courtesy service fees to pay. Overhaul an maintenance shops have the approval of th CAA and are equipped to service all excep large four-engine airliners. The whole ide behind this operation is to "bend over back wards to keep pilots and passengers happy. Sounds invitin' to this department!

Signs of the Times

EAGLE GROVE, IOWA—Celebrating Iowa' hundredth birthday, this aviation minde town included three airplanes from the ne airport in the Centennial Celebration. No the first time a plane has been taxied in parade down a Main Street perhaps, but th first time in a hundred years on Eagl Grove's Main Street.

Southward Ho!

LOS ANGELES, CALIFORNIA—Three Bra zilian pilots left the North American Aviatio Corporation plant for home (a wee south o the border, i.e. Sao Paulo, Brazil) in *Navion*. The trio flew down the west coas of Mexico and Central America, across th northern part of South America and dow the east coast of that continent to Sa Paulo. . . .

And there was a time when the persona plane was considered a good medium fo circling the home town—but no furthe Those days are gone forever—thank goodnes

Good Operating Practices

WASHINGTON, D. C.—Certificates of goo operating practices are currently bein awarded by National Aeronautic Associatio to private airports adjudged to have co formed with high safety and service standard

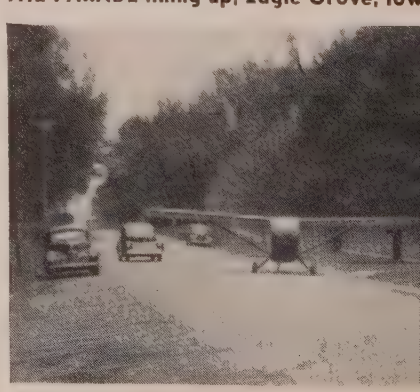
Regional awards will be given to those ai ports having the highest standards.

The committee has set itself up as unwil ing to compromise on any question vital t safety. Several airports have been rejecte for one or more of the following reasons could not be identified as an airport from th air; no markings to indicate temporaril closed fields; did not check fuel for wate a seaplane base was not cleared of floatin logs; and, one airport had no air traffic rule

Strictly from Hunger

MILFORD, CONNECTICUT—Airports aren built in a day but in the process pilo seem to go hungry—but not week ends her A group of pilots make sandwiches and h coffee, carry them to the field, then sell the at a profit. You've guessed it—lady pilot

THE PARADE lining up, Eagle Grove, Iow



Pint-Size Radio you can count on—

The Lear PXer, transmitter-receiver model TR-1B

The LEAR PXer

It takes only 4" x 5" on the instrument panel. It weighs only 15 pounds including everything. Yet the Lear PXer is a dependable, far-reaching radio transmitter-receiver that spells peace of mind for the light-plane user.

It means that the private pilot can keep in contact with the fields — know what weather's ahead — follow the beams, check the ranges — and fly across country with all the confidence and safety of a transport pilot.

For 17 years Lear Radios have held an enviable reputation for outstanding dependability. They are flying everywhere — from Alaska to South America. And Lear specialists in installation and service are strategically located so that skilled attention is never far away.

This is why you'll want a Lear PXer in your personal plane. Read over the facts in the panel — or write for further information. LEAR, Incorporated, Aviation Radio Sales, 110 Ionia Avenue, N.W., Grand Rapids 2, Michigan.

CHECK LIST OF FEATURES OF THE LEAR TR-1B PXer

- ★ Weighs only fifteen pounds complete — transmitter — receiver — power supply — mike and phones
- ★ Low price
- ★ Range filter
- ★ Provision for direction finder
- ★ Dependable
- ★ Highly sensitive and selective
- ★ Transmits on 3105 or 6210 KC.

LEAR RADIO

The Name Men Fly By

Order from any aviation dealer — or specify Lear Radio when you order your new personal airplane.

FLYING FIREMEN

Nation's smokejumpers save Uncle Sam thousands of dollars in timber

By TAMARA ANDREEVE

THUNDER rolled across the heavens; black clouds tumbled and lightning split the air. An electrical storm, the dread of all woodsmen, crashed awesomely, illumining the rugged peaks of the wooded Montana mountain country. Seconds later, telltale spirals of smoke reached knotted fingers toward the sky. Lightning fires, the flames that every year destroyed millions of dollars worth of timber, were on the loose again.

The seconds became minutes, then out of the murkiness of the dark skies, streaked a plane. Over the spirals of smoke, two objects were seen to fall, two 'chutes mushroomed out. These were smokejumpers, swinging in their 'chutes, dropping down to fight the fire that in so short a time could become licking flames of destruction.

It was August, 1940, when an unprecedented number of forest fires had been reported all over the Northwest. Strapped for funds, the forest ranger stations had only six trained air firemen to fight the blazes that dotted the countryside. These two swinging in their slotted 'chutes, were part of that tiny crew.

Wearing heavy boots, wire masks and thickly padded suits, the men looked like a couple of grid stars, but the grim expressions on their faces bespoke their mission—and it was not a game of pleasure. Instead, it was a (*Continued on page 59*)

FOREST FIRES, raging through valuable timberlands of the West, destroy countless thousands of dollars in forest property. Fire watchers maintain constant look-out to catch and put out fires before they get out of control

SMOKEJUMPERS, dressed in protective suits, look more like football players or jet pilots than fire fighters. Jumpers *(above)* are getting ready for a fire hop

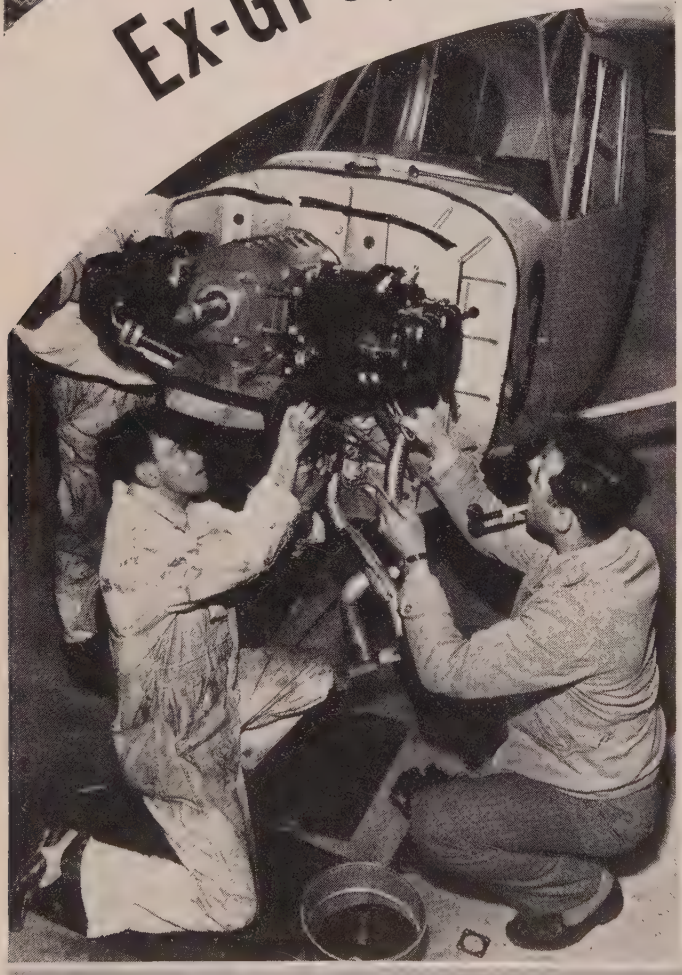
'CHUTING DOWN, soon as smokejumpers land, they contact plane via short-wave radio, report extent of fire and what they're doing to extinguish blaze. These men, especially trained, work in pairs

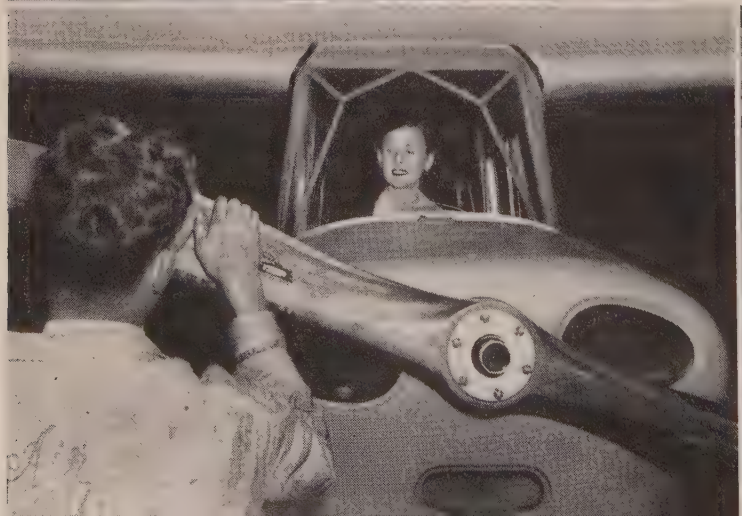
Ex-GI's, Learn to Fly for Free!

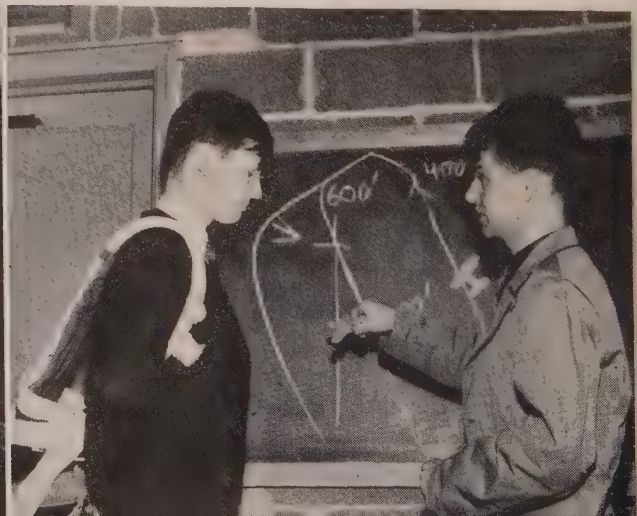
By ROBERT C. FRANKLIN

It's back to school for air-minded veterans, with Uncle Sam paying the bill

SO you've always wanted a chance to learn to fly? Well, one big way Uncle Sam is trying to show appreciation for what millions of boys had to give up in defense of their country is to say it with schooling. And under an amendment to the GI Bill of Rights that includes flight training. An eligible veteran, man or woman, ex-officer or ex-enlisted man, may elect to enroll for flight training in any flying school or flight training institution which has been approved by the appropriate state agency. As of the end of 1946 the records in Washington as to the status of schools throughout the country which had been approved by the Civil Aeronautics Administration







NIGHT MAINTENANCE shop *(center, left)* at Air Facilities, Teterboro, N. J., keeps kiwis like ex-Spar *(below)* on wing. Flight problems are explained on field

NAVY VET, seated, turns plane over to Army vet for a X-country *(above)*. Commercial course is taught in fully equipped Fairchild F-24 *(center, right)*

and which also had a contract with the Veterans Administration were snowed under, but there now are an estimated several hundred of such schools, with more being approved all the time.

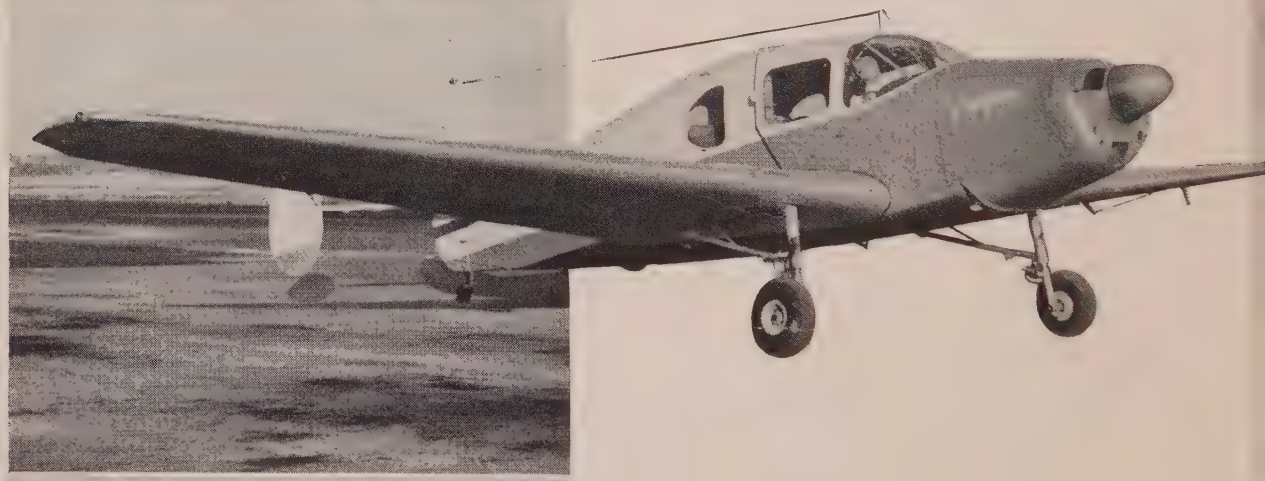
One thing, though. Fundamentally it's not just a matter of flying as such, of running out to the nearest airfield and spending lots of time in the air just because you find you like to fly. You have to enroll for a definite *course* of flight instruction consisting of one "unit flight course" or a combination of unit flight courses. This means a program of study and training which is so organized that its successful completion meets the requirements for a CAA certificate or rating. These include the Private Pilot Certificate, Commercial Pilot Certificate, Flight Instructor Rating, or Instrument Rating. A non-flight aeronautical ground course is the Airplane and Engine Mechanic's course, leading to the A & E (*Continued on page 62*)

LUNCH WAGON comes to field, allowing students more time for flying. Ass't. Op. Mgr. Dungan *(bottom, right)* uses mike in office to assemble students

A Bandleader Gets Some Air

By VAUGHN MONROE

Making "on-tour" hops in his own personal plane means more rest and more fun to the traveling orchestra leader



BANDLEADER-PILOT Monroe recently added seaplane rating to his already much-used private pilot's license

IF YOU'VE never had the heartaches and the headaches of a bandleader, you probably are one of those people who envy the easy life of the guy who stands on the bandstand and waves a menacing stick. There was once a song written for this kind of naive envy. It was called "I've Got Those 'Oh What An Easy Job You've Got, All You Do Is Wave a Stick' Blues."

MODEL PLANES come in for their share of interest on the part of this Bandleader

Brother, don't you believe it! That's why I've taken to the air! And—why I recommend it highly.

I don't know if you're familiar with my business or not. A small part of every year I am able to "sit down" in a New York Hotel with my band. We may also have an opportunity to rest for a few weeks at one of the major spots in Chicago and Hollywood, but the rest of the time we're moving—from town to town—so fast you'd think the sheriff was after us, for it's on the road, playing a dance tonight in Erie and tomorrow in Dayton, then a week at the theater in Cleveland, that a band makes its real money.

The average band travels hundreds of thousands of miles every year. Some bands will go as many as 60 days, never staying in the same town for more than one day, and it's usually 400 or 500 miles to the next stop.

There are a couple of hitches to a life like that and one of them is "When do you sleep?" Now do you understand why they call me the "flying bandleader?"

In the first place, I have always been slightly daffy over planes . . . big ones, little ones, or in-betweens. In fact, I like anything with a motor in it, including motorcycles (Indian built me a special job that's a honey . . . for $1,600!) Years ago I decided I was going to get my hours in and get my license. It took me quite a while to pile up time because I could never stay in one place where I could be checked out regularly. But I kept flying whenever I had the chance, getting experience and time in, until finally I was ready to take the test for that precious ticket. Though some of my more leery friends still don't believe it, Uncle Sam said that it would be all right if I'd buy a pair of wings and a propeller and get myself some air!

My first ship was an Aeronca *Champion*, a little two-place trainer. I really wanted a faster plane and at least a four-seater, but in these days you take what you can get. I named the Aeronca "Cantina" after my daughters Candy and Christina.

As it became more obvious that the Aeronca wasn't quite fast enough to suit my specialized purpose, I sold it and bought a Bellanca *Cruisair Sr.* I still have Cantina II, the Bellanca, although I am eying another plane now—a Piper *Skysedan.* I guess I'm like most pilots—soon as I get one ship and break it in, I start looking around for another, perhaps a better one.

In the past five or six months that I've had the Bellanca I have flown thousands of miles. While the band was on one-nighters (single night appearances in small town ballrooms), I made 80 per cent of the trips by plane, averaging about 200 miles a night. I have even hired a pilot. I keep him on the payroll, full (*Continued on page 64*)

LESSON ONE in all flying, says author as he looks into gas tank, is to be sure your plane has plenty of fuel

MOTORCYCLE fan, too, Monroe likes anything with a motor in it. He's put in lots of time on his motorcycle

DECCA

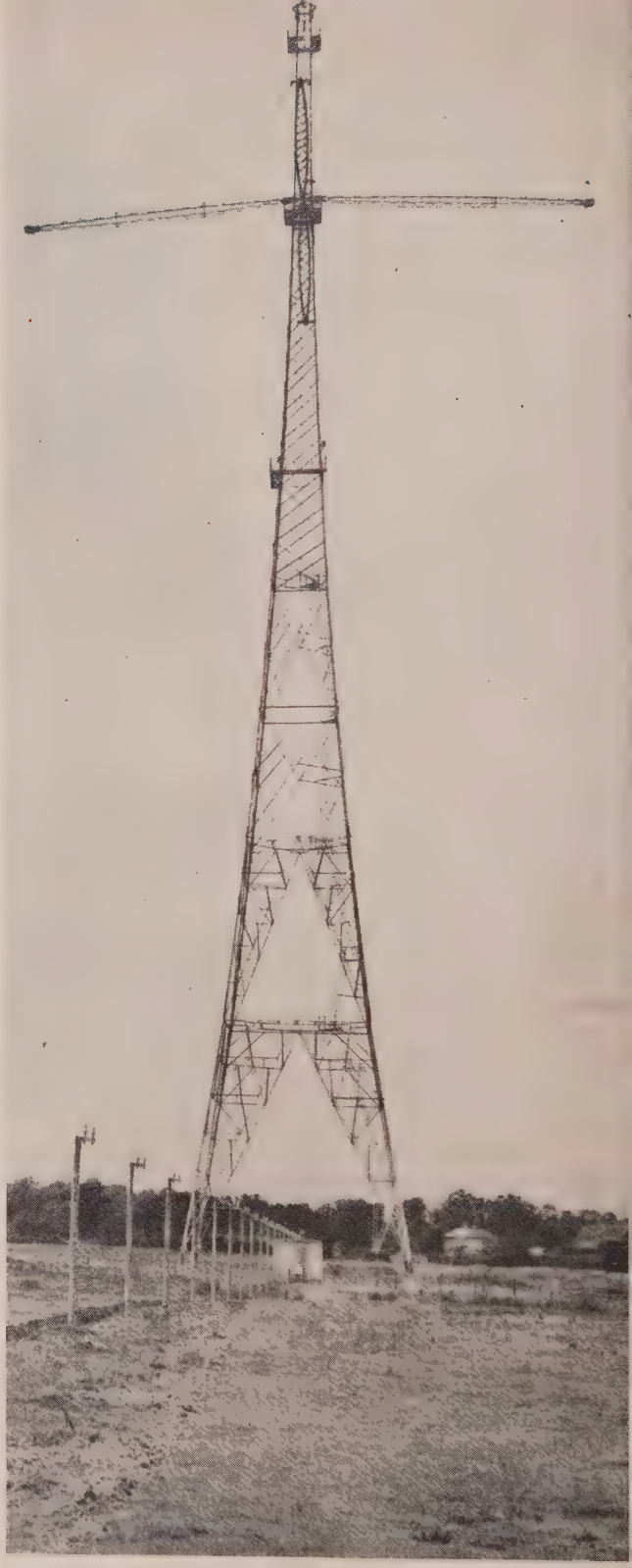
TO THE RESCUE

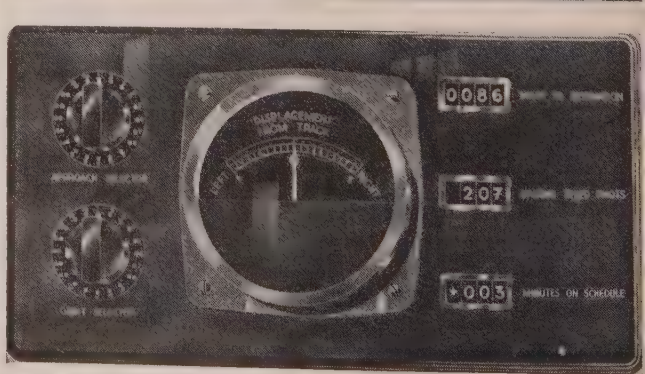
By N. F. SILSBEE

THE big bad wolf chasing our domestic airlines right now is the traffic jam over busy airports when the weather closes in. It was bad enough last year when about 400 planes were running, most of them twin-engine jobs. It is ever so much worse now, with more than 600 planes, many of them bigger, faster four-engine DC-4's and *Constellations.* A saturation point has already been reached over some of our major junction and terminal airports—especially New York, Washington and Chicago—which is proving a serious bottleneck to the expansion of airline travel. Many have warned that this situation would arise. Now it is here, and as far as this winter is concerned it is a case of too little, too late.

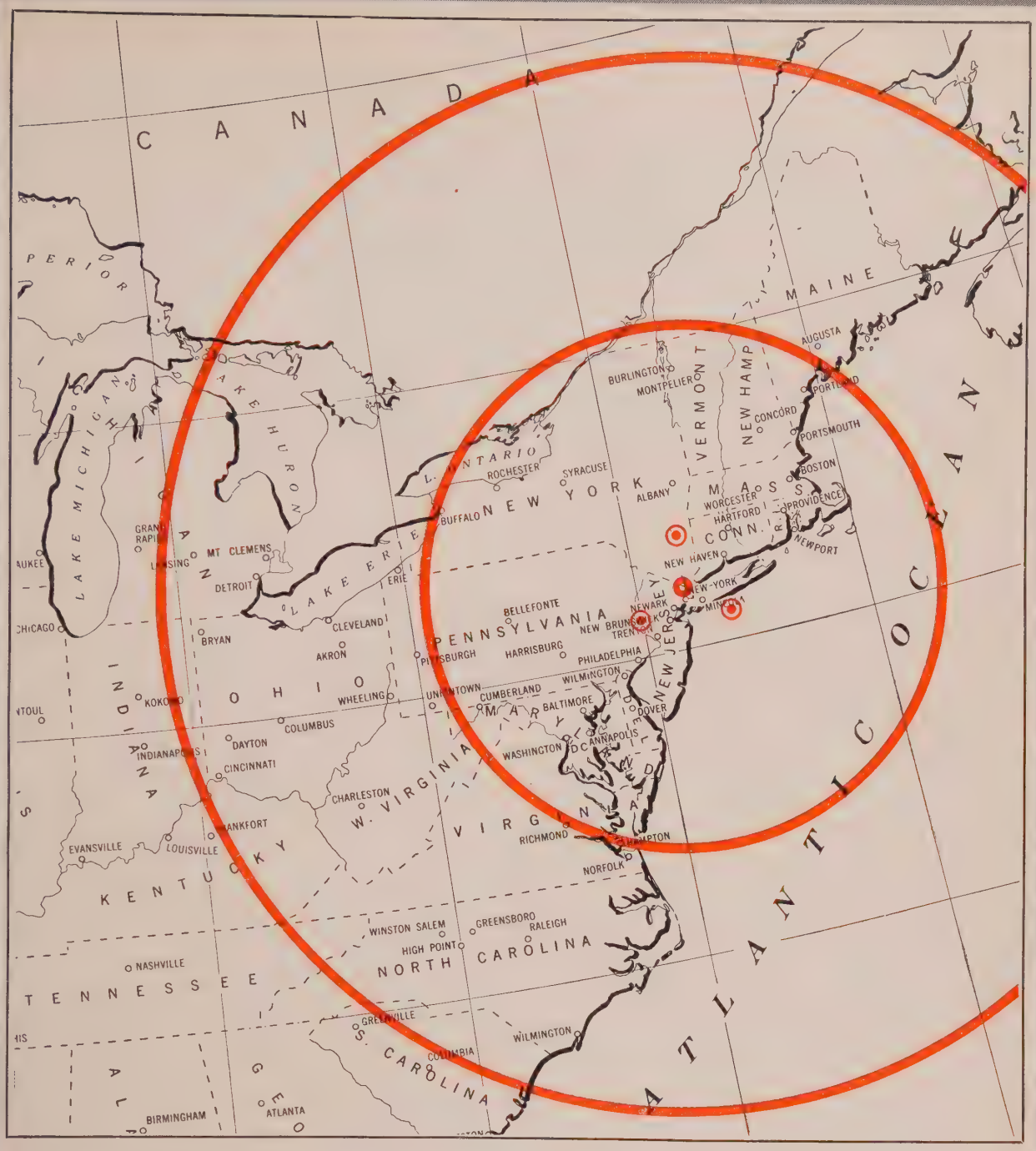
The CAA reports that during the first six months of 1946 stacked airline transports spent 1,721 hours in profitless flying, more than one-third of this total being over the New York and Washington areas. Besides the financial loss running into the millions for such stacking and for cancelled flights, the effect on pilot nerves and morale and ruffled passenger dispositions is incalculable. CAA's Instrument Landing System (ILS) will help some, although the full fruits of this may not be realized until next winter. Beginning early this year experimental operation of radar ground controlled approach (GCA) at LaGuardia Field, Washington and Chicago should also help. A new means of easing this critical problem, not widely discussed hitherto, is the Decca Track Control Unit, used in conjunction with the Decca Navigational Aid System. This is already in successful use in Great Britain, with plans under way for an initial installation in the highly congested New York area.

The main Decca system for free flight enables a pilot to get an instantaneous and accurate position-fix at any altitude and regardless of weather conditions. This is made possible by the continuous emission of long-wave (*Continued on page 66*)

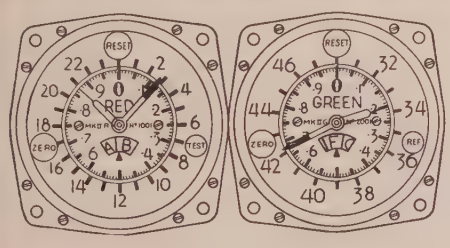


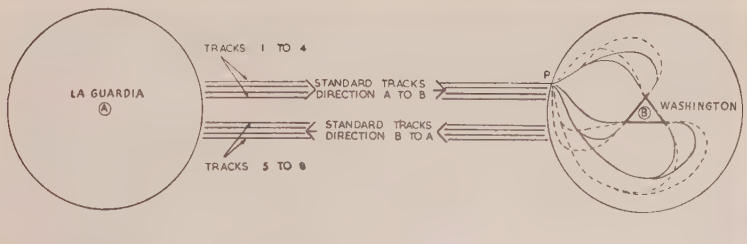


DECCA SLAVE station consists of 325-foot radio mast and serial, transmits signals in step with Master station. *(Right)* Track Control unit on pilot's panel supplies constant indication of pre-selected flight track



DAYLIGHT COVERAGE of proposed installation of Decca Navigation System for New York area is 600 miles (large circle), night coverage 300 miles (smaller circle). Master station (middle dot) is to be near Mahopac (NY). Slaves in Long Island, New Jersey, New York. System, with Master and any pair of Slaves, provides complete 360° coverage. *(Below, left)* Meters on Decca Receiver indicate lettered zones and numbered hyperbolic lines, which plotted on Decca charts give position. *(Right)* Illustrative pattern of point-to-point Tracks and Approach Tracks and Orbits, Washington Airport





CITY BOUND on business, above, 1947 pilot heads for field nearest to the business area

SPRING STEEL gear wards off ground loops by spreading. Salesmen, note relief tube

CESSNA 140 panel is neat, compact. Radio mounts on right. Trim is center, on floor

LANDING SPEED of this high-wing monoplane is a low 41 mph with flaps. Fuselage is all-metal, wings fabric

A PILOT REPORTS... CESSNA 140

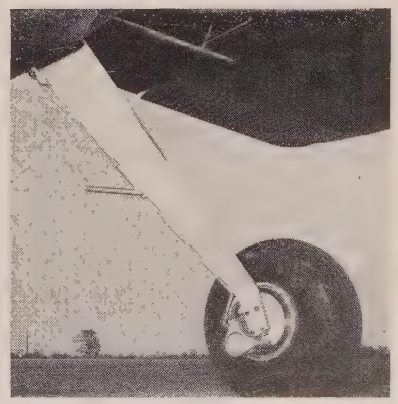
This roomy side-by-side two-placer will fly straight and level hands off, is easy to land—hard to spin

By GENE LANDMAN

HAVE you heard about the two-place personal plane that sports a spring-steel landing gear with more knee action than an adagio dancer? When you do hear about it (or if you have then you already know), the plane it's attached to is the Cessna 140 (the 120, too)—designed and being produced by Cessna Aircraft Company, Wichita, Kansas. The gear, being a one-piece, thin, willowy thing, makes the all-metal craft resemble a spindly colt just trying its legs. But don't let appearances throw you. These legs have been tried. Some 3,500 140's and 120's were gracing airports as of January, 1947, with nary a landing gear default in the lot.

Cessna NC 76310, which Jim Welsch of Personal Airplanes Sales, Corp., New York City, loaned to SKYWAYS for a try-out, is a 140. It differs from the 120 in only one respect, *i.e.*, the amount of equipment and accessories. For instance, the 140 comes equipped with flaps, starter, generator, floor rug, cabin heater, mixture control, radio antenna and navigation lights. The owner of a 120 starts with the bare necessities and then adds to his plane as time goes on—sorta like the new home owner who adds luxuries to his house. The 120 is more nearly a training plane, or at least a step in the direction toward ownership of a 140. Your SKYWAYS reporter doesn't consider the 140 a training ship. It's like teaching a boy to hunt.

ONE PIECE landing gear cuts the maintenance worries to a minimum



TWO WING fuel tanks hold total 25 gallons, *top*. Afloat on Edo's floats, Cessna undecided about use of spring steel leg thereon. Visibility would be tops on floats

You buy him inexpensive equipment at first, teach him to use it and take care of it, instruct him how to be cautious, then as soon as he shows progress, which usually comes from experience, you turn over a shiny new Remington rifle to him. The same is true with flying. You learn to fly in ships lacking in real refinements, that are inexpensive in construction so that repairs caused by minor mishaps are not costly. The Cessna 140—like the better gun—is for the fellow who already has learned the rudiments, *i.e.*, taxiing, how to use brakes without nosing over, how to gauge fuel consumption, etc. In short he's the pilot who has outgrown the airport-circling type of flying and is, in fact, ready to follow the swallows South. This pilot shops around for a side-by-side airplane because he's usually ready to take along a passenger. He is willing to pay for extra baggage space, interiors with craftsman-like finishings, extra fuel capacity for longer range, more horsepower for faster cruising, and such little niceties as carpets, functional seating arrangement, toe brakes (large and effective), extra hand grips to get in and out, roomy cabins, etc. That's what the pilot who is ready for cross-country flying looks for in a plane and gets in the Cessna 140.

Another Cessna fan is the fixed-base operator who wants a side-by-side two-place ship that he can use to train licensed pilots who want cross-country experience. The fixed-base operator may well elect to own a 120, too—after all how many stable owners haul out their best saddle and bridle for an everyday gallop? He saves his best gear for the County Fair and the Show riders, and that's what the 140 is for—identical to the 120 as far as flight characteristics are concerned, but dressed up from the equipment point of view. Take the landing gear itself for in- (*Continued on page 68*)

RESORT COUNTRY 1,000 miles away flown to in one refueling stop at 108 mph—or St. Louis to Miami, 10 hours

The TIME and the PLACE

Surest, simplest navigating is done with ease by timing the check points

ASK any pilot with a page or more of cross-country entries in his log book what he considers the most dependable kind of "horseback" navigation—that is, without radio or sextant—and if he doesn't say "time navigation," he won't be in agreement with this writer.

The common timepiece provides the surest kind of offhand navigation. Of course, you need a compass and an aero chart but if you learn to let Father Time have the final word you'll become the hangar flyer who has the enviable record of never having missed a check point. Our contention is that while the compass is the Number 1 instrument for hitting the right place, still and all the watch, or the airplane clock, is the prime factor for getting there at the right time . . . which as the case might be could mean getting there at all.

There are four requisites to successful time navigation. These are:

1. Get a watch if you don't have a clock on your instrument panel—and if you have a stop-watch, you're really set;
2. Figure your ground speed (computing from the real, not advertised, airspeed your 'craft makes);
3. Find out beforehand whether your compass is correct, or if not, just how wrong it is and in what directions (called deviation);
4. Draw a line on your aero chart from take-off point to destination marking off this course line at the mile intervals best suited to the airspeed of your plane.

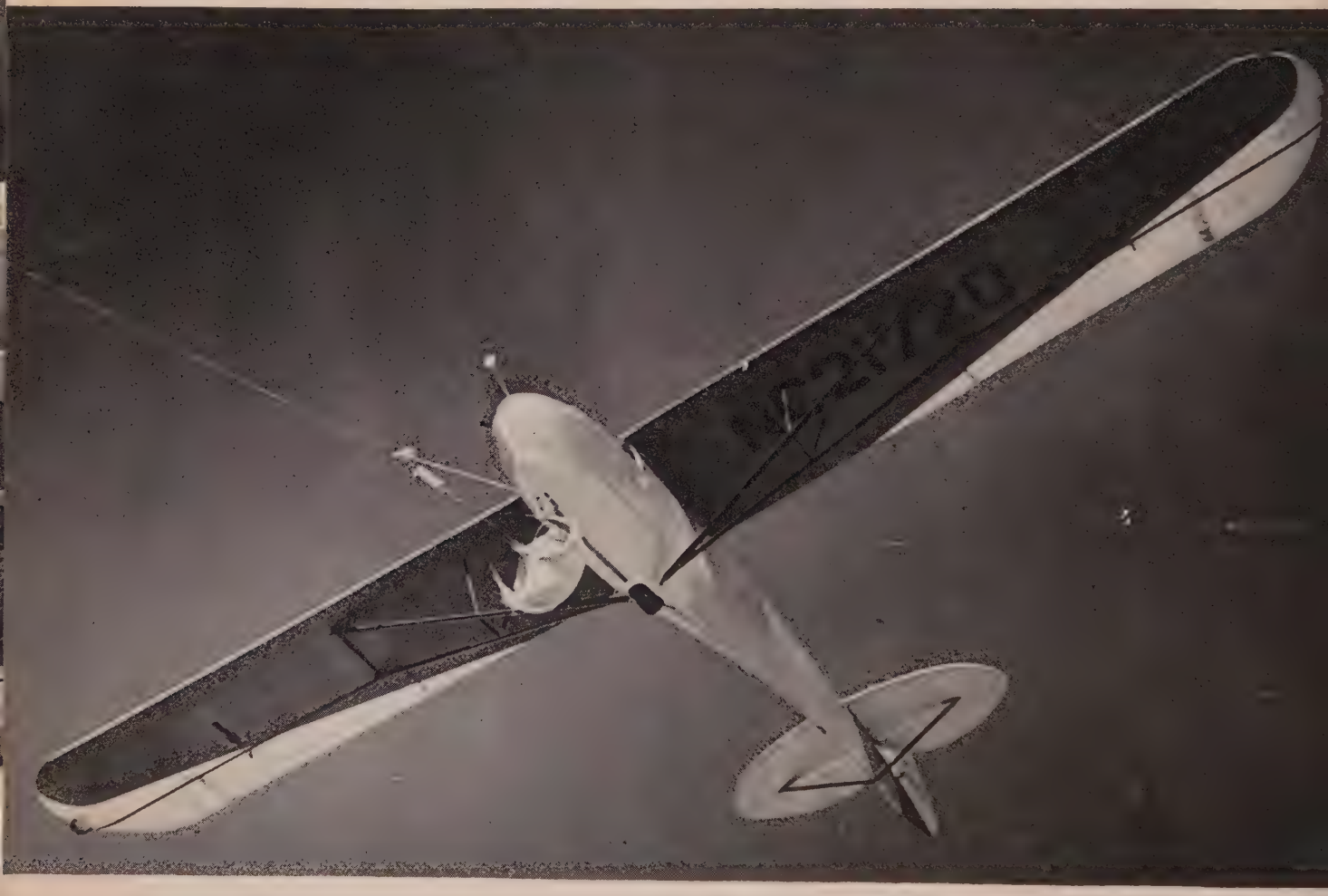
Now to try out on paper this business of navigating by the watch; suppose: you're at the Pitman airport (it's about 10 miles south of Philadelphia on the Washington S.A.C.) and you want to fly down to Easton, Maryland, 85 miles southwest (also on the Washington S.A.C.).

Draw your course line and measure the number of miles. Figure your compass heading without wind correction or variation correction (it's 233°).

The cruising speed of your plane at your preferred throttle setting being 87 mph, it looks like you will take an even hour to get there (you're traveling 87 mph and have 85 miles to travel). So why not divide your course line so that every quarter hour by the clock you time check your position? This would be every 21 miles (*i.e.* one quarter of the total distance of 85 miles). Thus, on your aero map mark off 21-mile divisions on your course line. Here's a practical tip . . . don't plan to check your position by time navigation at intervals closer than 15 minutes—20-minute intervals are best for accuracy. This is what was meant by suggestion 4 which stated: "Mark off the course line at mile intervals best suited to the average speed of your craft." Recently, on a 1,200-mile cross country trip in a craft averaging 90-mph, we marked off the course line at 30-mile intervals because at the end of the third check point one hour of the time would be up if the craft was making 90-mph . . . if making less than 90 mph it would have been observed by the first or second check point for they would not be reached in one-third and two-thirds of an hour respectively (*i.e.* 20 minutes and then 40 (*Continued on page 72*)

THE TOW is the trouble with sailplane flying. But once in air, motorless planes are literally free as a bird

BEST METHOD for launching of gliders is the airplane tow although auto tow and winches have their place too



SPOT LANDINGS in gliders are not easy—yet in contests as many as a dozen pilots stop within foot of spot

POWER PILOTS ARE SECOND BEST

Soaring like the birds proves glider pilot is a finished flyer who knows and abides by the laws of levitation

By JOHNNIE ROBINSON

NO MATTER what you fly, Piper *Cub*, Stinson *150* or airliner, I don't think you powerplane pilots know much about actual flying.

Here is why:

You pilots are always depending on that motor, and somewhere along the line when that mechanical gadget lets you down, you're in a bad jam. Sailplane pilots never have that worry.

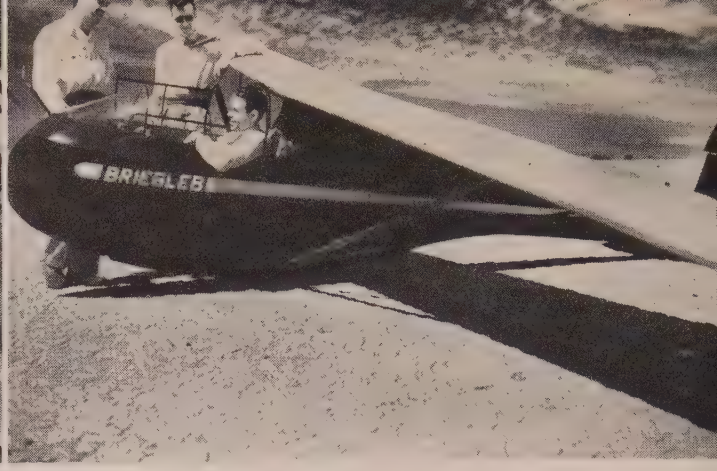
You don't know much about applied meteorology. The winds can help or hinder a pilot greatly, but you feel that all the power in the air is under your throttle hand. Many of you flyers, especially heavyplane chauffeurs, don't really fly an airplane. You point it in the general direction you want to go and let the airplane fly you.

For cross-country flying with a thrill, I'll take a sailplane every time. You'll never get spine-tingling experiences of crowding the eagles and buzzards from their favorite aerial haunts with a chattering, vibrating, power plane! This soaring is pure sport. There is no competition I know of so keen and exacting as contest sailplane flying when 10 or more sleek, thin-winged sailplanes circle silently in the same thermal, each trying to be top man in the stack. In powered-plane competition, the pilot with the most horsepower is the winner; in soaring, as in yachting, it is the pilot who can make the most of his wind and weather conditions who wins.

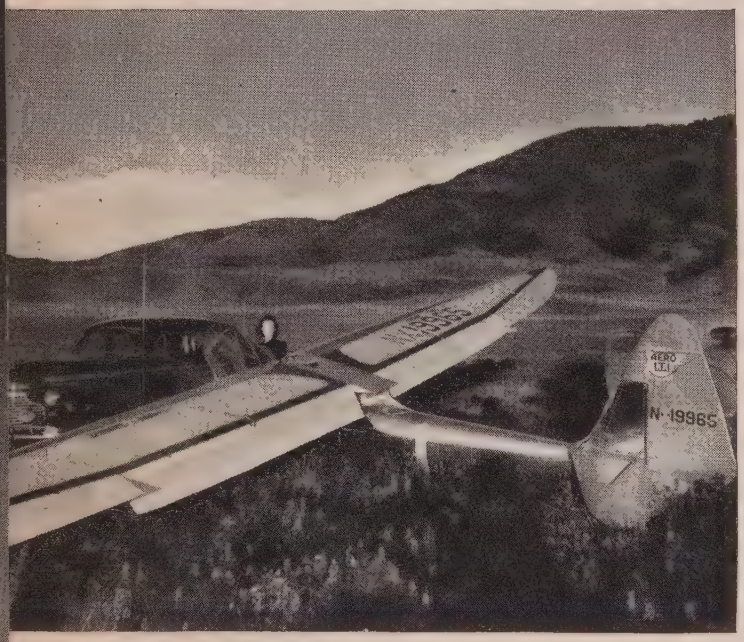
I've been flying sailplanes since high school days in 1930 when we sling-shot rickety primary gliders from the cliffs overlooking the ocean near San Diego. I've logged more time, I believe, in motorless planes than anyone else in the country; 1,500

THE AUTHOR, Johnnie Robinson, checks map prior to a flight in his glider, "Zanonia"

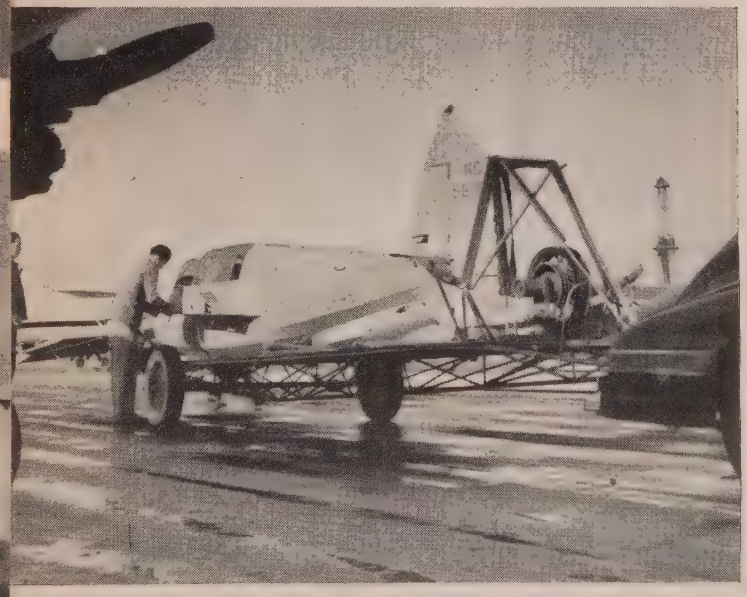
HANGAR FLYING sailplaners discuss thermal efficiency and other meteorological phenomena important to them



CLOUD STREETS assure glider pilot a cross country trip. Cumulus clouds furnish desirable up-drafts for soaring



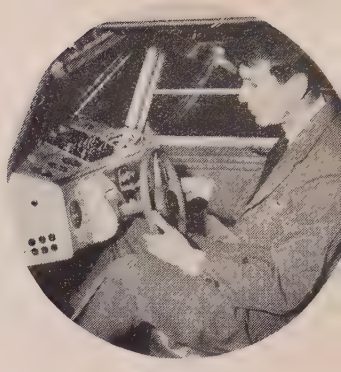
ALL ALONE in clouds 'til thermals let 'm down, then the pilot settles for landing in flowery meadow, as *above*. Glider is brought to airport on trailer, *below*



hours, and yet I've never soloed a power-plane. Sure, I've flown them, and I get along all right, but I never got enough thrill out of the noise and vibration of powerplanes to take the time and expense to check out in one. I've always had a glider of my own and it was cheaper for me to fly it than buy power time. Cost and upkeep of gliders vary, but they are no more expensive than flying a light powerplane. My prize-winning "Zanonia" originally cost film actor Harvey Stevens $3,000. I bought it for much less than that after a crack-up, and then repaired it. Licensed surplus sailplanes are currently selling for $700 to $1,000.

In all the soaring instructions I've given to pilots with thousands of hours in powerplanes, I've found them consistently making the same mistakes. I had one Army Lieutenant, a C-47 transport pilot, who got lost within sight of our airport at Twentynine Palms. We'd been spiraling up in a thermal and he hadn't paid any attention to his wind drift. When I asked him to head for the field, he couldn't find it. He was so accustomed to flying radio ranges that he had almost forgotten how to read a map, and I had to point out the field. If I hadn't we'd have landed out in the sagebrush. Many heavy-airplane pilots are so busy with cockpit procedures and that maze of gadgets inside the cockpit that they never take time out to really learn to fly.

The average power pilot does a sloppy job of flying in a sailplane. Lack of co-ordination shows up more quickly in a 400-pound sailplane than it does in a 20-ton transport. It takes more rudder to swing the long wings of a sailplane into a turn than it does in a powerplane. Few pilots look around enough. You need your neck on a swivel in thermal flying, with a dozen ships going up in the same column of air. All soaring is done on essentially one of two types of rising air. Thermals are the large rising bubbles of hot air found in the desert. Towering cumulus clouds often top these thermals, making them easily seen by sailplane pilots. Slope winds, on the other hand, (*Continued on page 74*)



The Amazing AIRPHIBIAN

By C. B. COLBY

MARK TWAIN once made a crack about the weather to the effect that "everybody talks about it but nobody does anything about it." The same might be said about the combination auto and airplane project which has skittered in and out of the aviation picture every few years.

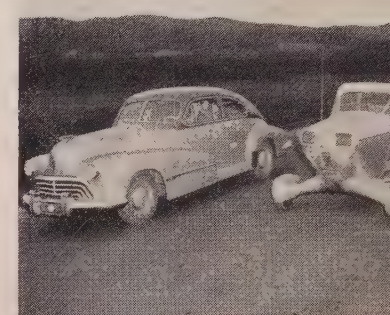
It looks now as though that tricky gadget has flitted in again, to STAY, thanks to a well-known name in history that is repeating in another field of science. The inventor of the steamboat, Robert Fulton, left not only the steamboat to the world but a namesake descendant that like his forebearer just can't help inventing things—among them the carplane.

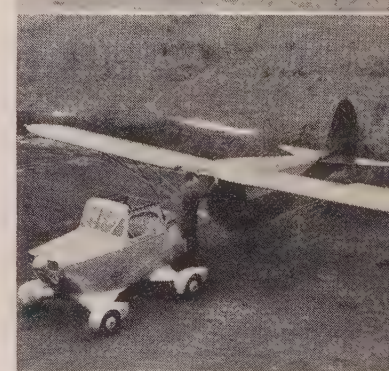
During the war Robert E. Fulton, Jr., then head of Flight Training Research Association perfected the Navy's Gun Airstructor along with a host of other fantastic devices for short-cut training of gunners, airmen, navigators and such. Since the war, Mr. Fulton, as President, and nine of his former associates, under the name of Continental, Inc., have been working in almost atom-bomb-secrecy in a small hangar and shop at the Danbury (Conn.) airport. The result is named the *Airphibian* and is one of the most ingenious workable pieces of aeronautical engineering ever to fly.

Although at the time of writing very little technical data on the *Airphibian* was available due to a company policy of reticence, much of the story of the aircraft can be told.

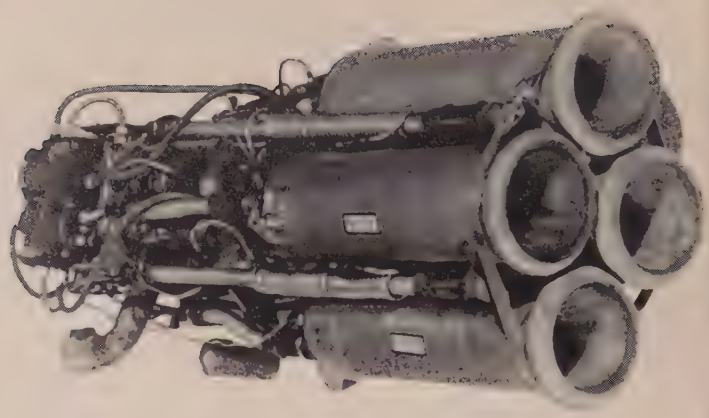
At first glance, in flight, the *Airphibian* appears like any other high-wing monoplane. Three things, however, soon catch the eye—and ear. First, the four-wheel landing gear; secondly, the appearance of solidity, and finally the silence of the aircraft. Equipped with a muffler for highway travel, and a stubby three-bladed wooden propeller built to their specifications by Sensenich the noise of the prop-engine combination is at a startling minimum. As I watched the ship for an hour or more taking off and landing, and circling the field it was almost inaudible. A low smooth drone, audible at close range was all one could hear.

This aircraft is constructed in two sections, each complete in itself and quickly joined together to form a flyaway unit. The front half is a sleek, all-metal convertible coupe, resembling some make of foreign car. Each of the four wheels are set into streamlined struts and are half-panted. The (*Continued on page 76*)

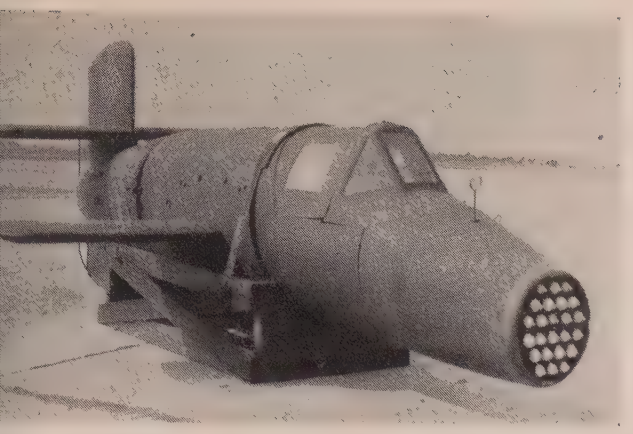




THE ANSWER to problem of owning a car or a plane is: owning an aircar. The two-place *Airphibian* travels 45 mph, *above right*, as a car; can be driven top down if desired. One person can make ends meet in this business. Tail wheel, *right*, can be retracted



NOZZLE END of Reaction Motors four-cylinder rocket engine which delivers a total of 6,000 pounds of thrust



GERMAN NATTER (Viper), last-ditch rocket intercepter against Allied bombers, used Walter 109-509 unit

ROCKET POWER

Reaction Motors' rocket engine is first of such power plants for U. S. guided missiles and piloted planes

By LOUIS BRUCHISS

BY THE time this appears in print, the 6,000-pound thrust rocket engine designed and built by Reaction Motors, of Dover, New Jersey,—and previously heavily shrouded in secrecy—will have been demonstrated by the Navy Department, and flight tested in AAF's first supersonic plane, the Bell XS-1

Reaction Motors is a young organization headed by a quartet of rocket engineers who, in years before the war, were looked upon as amateur enthusiasts and suffered to go their experimental way only by the indulgence of other branches of engineering and the public.

Until recently, they had their headquarters at Pompton Lakes, N. J., but the proximity of their rocket-engine test stands to the highway was a source of public annoyance. The high-pitched whine of the powerful exhaust jets produces a shock wave that buffets and nauseates personnel close to them.

Now Reaction Motors is quartered in spacious buildings on the grounds of the Naval Ammunition Depot at Dover. Their numerous test stands and cells, built into concrete Quonset-type structures, are located in a wooded area well away from administration buildings and research laboratories.

Intermingled with the boom of occasional naval shellfire tests, one can now hear the far-away roar of the rocket engines in the Dover area.

Under strict guard, the whole project is significant because it indicates that the Navy, as well as the Army, is keenly aware of the potentialities of rocket power plants for military aircraft. They are convinced that the three outstanding advantages of rocket engines must never be lost from sight. The first of these advantages is tremendous power compressed within an exceptionally small package.

The second is the generation of this power in a mechanical device which has no moving parts.

The third is that the engine is independent of the atmosphere. Given a sufficient amount of fuel it can penetrate far beyond the stratosphere at speeds up to thousands of miles per hour.

The R.M. 6,000-pound thrust figure is roughly the equivalent of that much horsepower. In evaluating the measurement of power from a rocket engine or from any other type of jet propulsion device, the jet velocity of the gases of combustion are taken as a basis. However, horsepower equals pounds of thrust only at about 375 mph, since the conversion equation takes into account the speed of the vehicle to which the power plant is attached. Here is the formula:

$$HP = \frac{\text{Thrust in pounds} \times \text{Air Speed (in ft/sec.)}}{550}$$

For example, 4,000 pounds of thrust equals 4,000 horsepower at 375 mph, and 8,000 hp at 750 mph. (8,000 hp=4,000 lbs. of thrust x 1,100 (i.e., 146,667 ft/sec. x 750) divided by 550).

We have no reciprocating internal combustion engine of 6,000 hp operating today. The engines near that figure are very heavy, complex pieces of machinery (see "AAF's Seven-League Boots," page 61). Yet the R.M. rocket engine weighs only 200 pounds and can be carried easily by two men.

It has the following significant features:

It is actually composed of four cylinders, each with 1,500 pounds of thrust. Each unit can be started and throttled through to full power independent of the others, although a master control allows operation of all (*Continued on page 78*)

South of the Border....

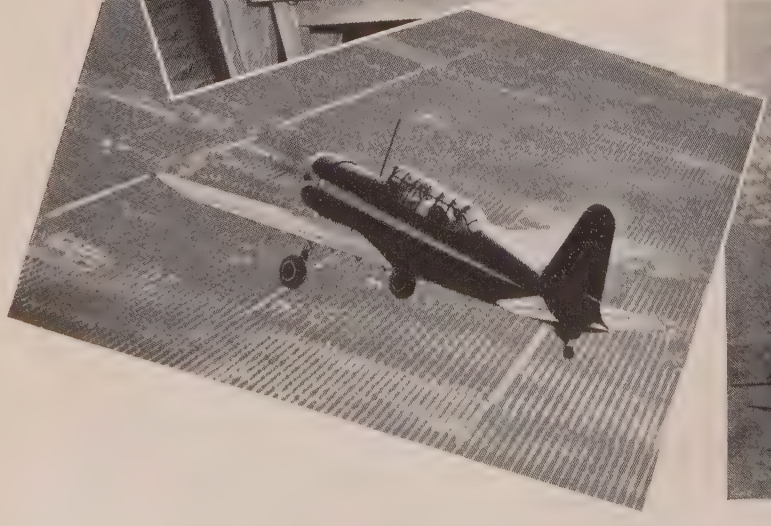
FOR years so-called troubadors have smitten the sound waves from Brooklyn to Beverly Hills with a song that ran "South of the Border dowwwn Me-hee-ko way. . . ." Few have been the listeners who haven't given some thought to making just such a junket. And not a few, all pilots or plane owners, recently got together out at Vail Field in Los Angeles, and made just such a trip. Theirs via their own planes, 180 of them altogether.

This weekend aerial junket "down Mexico way" was sponsored jointly by Vail Field and the *Cuerpo Areo de Baja California* in Ensenada, Mexico, the flying week-enders destination south of the border.

The flight, 181 miles each way, was made without incident, but with plenty of good flying, good fun and good food. An air show was held at Ensenada after the flying "tourists" arrived, and the winners of the various flight contests were given trophies. This was followed by a barbecue . . . and

ENSENADA-BOUND, participants wait for their airplanes to be gassed up for take-off

CUSTOMS OFFICERS checked the pilots and their passengers in LA's airport office *(left)*



PRIVATE PLANES Mexico-bound, fleet of 180 in all, included BT-13's, PT-19's, *Cubs,* etc.

ENSENADA CITY in background. BT-13 piloted by Jim Most circles on approach to landing field

by Plane

Personal-plane pilots, 180 strong, ring the fun-time cash register with an aerial weekend in Mexico

AIR SHOT of Ensenada field shows a portion of the 180 planes that made trip down from LA

MAIN STREET in Ensenada on Sunday morning looked more like a Saturday in the hometown

CURIO SHOPS did a land-office business when pilots and passengers toured town for gifts

BARBECUE TABLE was set up on oil drums at airport. Food was good and plentiful too

PILOTS FLEW on others' wings and tails *(above)* the 181 miles each way without mishap. Arriving *(below)* one pilot "goes around" while two land. An air show with stunt flying *(insert)* entertained the visitors

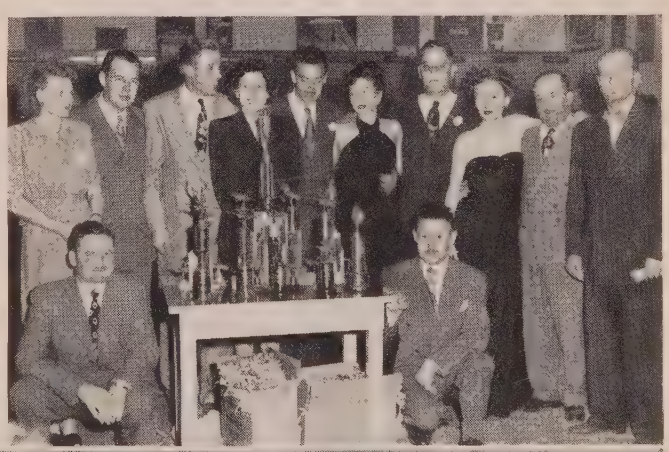
HOMEWARD-BOUND, the planes were checked back into States by Lindbergh Field Customs Officials, San Diego

I don't believe there can be any doubt as to how well that was received. If you've ever been around pilots, you're aware that there's nothing hungrier than a hungry pilot. Participation in the aerial weekend cost each person $10, and that sum covered the barbecue, a dance given the night the week-enders arrived, and their overnight lodging.

Customs officials at LA's Vail field cleared all the planes and their passengers on Saturday morning, before take-off. On the way back, however, the planes were cleared at Lindbergh Field in San Diego. And since the pilots had spent over 24 hours in Mexico each was allowed to bring $100 worth of merchandise back into the States duty-free. All of which was helpful because the visiting flyers—as visiting flyers always do—had spent a great deal of time (and money) buying curios.

Though the weather wasn't the best, and couldn't even be called "good," every plane made the trip without mishap. In fact the whole thing turned out so well that from now on the aerial junket to Ensenada is going to be an annual affair . . . "South of the Border, down Mexico way."

MEXICAN PATROL, on horseback, guarded the visiting planes *(above)* while their owners were at the dance given in town. Air Show winners received trophies



BT RACE was won by Jack Martin of LA. While it was going on, two new *Navions* sneaked into the competition

FLYING EXECUTIVE . .

SKY BABY, Gerber Products plane, is answer to company executives keeping far-flung business dates

"WHAT industry wants in a pilot" is beginning to be an important question, not only to the scores of Army and Navy flyers who are asking the question, but to industry, which is looking to the executive transport, i.e., company-owned plane, to save the time and energy of its key men.

Naturally, in this use of an airplane by industry young pilots see a chance to use the skills they came by in wartime—and what's more, the opportunity to build themselves a sound future in that industry, when their flying days are over.

American industry has long needed quick, efficient and inexpensive transportation to supplement normal commercial lines. There's no question about it. The program for the disposal of surplus aircraft opened the portals, if not the eyes, of American industry; so by way of War Assets Administration, industry jumped into aviation in a big way. The list of companies which are now using executive transport reads like a blue book of industry—Autolite, Kraft Foods, Frigidaire, Dresser Industries, our company—Gerber Products, Gar Woods, and scores of others. The number is growing as fast moving industrial organizations learn what an airplane can do for them.

Our experience may be of interest to other men in business who are considering the purchase of a plane and the subsequent hiring of a pilot or pilots to fly for them. Not to get the cart before

FLIGHT JACKET is worn by Chick Childs, Gerber Products pilot, *only* on off-duty test hops, etc. Their plane, a twin-engine Cessna, is based at Grand Rapids, Michigan

TIME OUT for preflight on a strange airport and the SKY BABY'S boss, Pilot Childs, is right on hand to see that it's done right. Note Chick's on-the-job "flying suit"

The Pilot

Company-owned plane in American industry offers the pilot a new kind of employment opportunity

By DAN GERBER

President of Gerber Products as told to T. P. McMann

the horse, in our case, there's the question, "why the plane?" A quick survey gave the answer.

Our main offices and baby food plants are located in the small town of Fremont, Michigan, 25 miles from Muskegon, with another plant in Oakland, California. Both plants are located right in the heart of two large fruit and vegetable producing areas, and certainly this is highly desirable from a business point of view. But in the instance of our Fremont establishment, the heart of our business transactions, we are isolated from frequent train schedules or any airline terminal—all of which is not too desirable. While we sell more baby food than anyone else in the industry, we have to meet competition (*Continued on page 80*)

DAN GERBER, *below*, is typical of business man who flies about in company-owned plane. His pilot points out minor adjustments, *right*. Pilot, *above*, inspects his plane

SOAP 'N' WATER is best for fabric-covered planes and windshields. Rinsing off soap, *above*, is important. Soft mops, *bottom*, take off the dried mud on fuselage

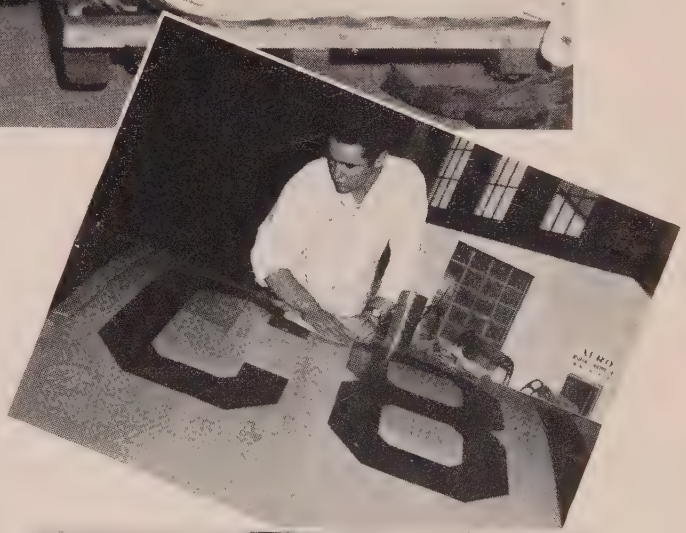
Keep It Clean

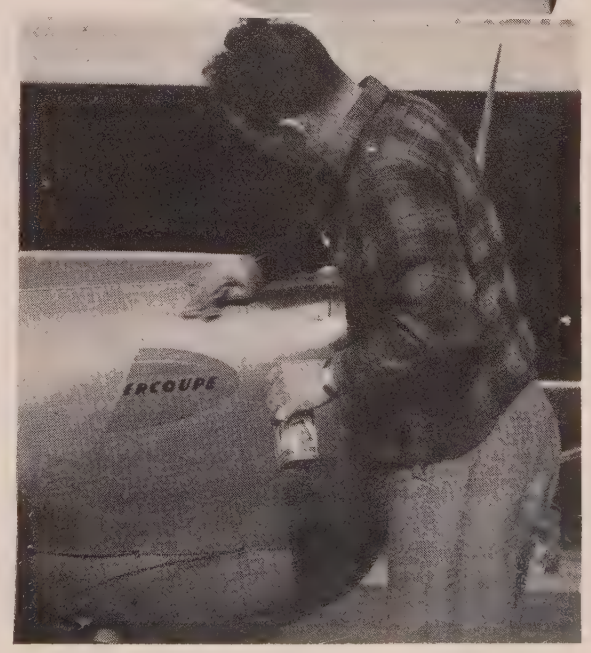
By BEN MACCABEE

"YOU can't tell a book by its cover," the man said, "but I'd rather ride in a plane that's not streaked with dirt. Maybe I'm a crank, but it has always seemed to me that the plane that looks cleanest is the one that shows better all around maintenance."

The man had something. He wasn't arguing for a trip to the washing area after every landing, but he was disturbed over the many plane owners and operators who let planes go for weeks at a time, in storage and out, with oil-streaked fuselages, muddy and greasy landing gear, scratched, smudged and discolored windshields and dirty cockpits.

This business of keeping your plane clean involves more than personal pride in its looks; it also saves money in the long run. Fabric lasts longer, general maintenance is easier, major components have a longer life, and in the case of flying





FINISH GLOSS is a hand job, *above and center*. Wax put out by fabric company is best on fabric, plywood too. Metal polish, *bottom*, shines aluminum

schools and services, students and passengers have a greater degree of confidence in an airplane that looks bright and clean.

The first important lesson in cleaning a plane is building resistance to high-pressure salesmanship. Many commercial cleaners are all-purpose jobs which produce exceptionally good results, but unfortunately the high caustic (alkaline) content which makes a preparation eminently suitable for cleaning floors or iron and steel, bars it from use on aluminum and aluminum alloys.

This does not mean that commercial cleaners are the bunk or that they will corrode metal surfaces or destroy fabrics. *Caveat Emptor.* Just make sure that a salesman's glib promises of safe cleaning for aircraft are carried out in print on the container as a guarantee from the manufacturer and you can't go very far wrong.

The service manager of a major personal plane distributor says that while an operator with a large number of planes may look for fast commercial cleaners, as far as he's concerned, the surest thus safest and best way to clean any personal plane, whether it be the all-metal, a metal and fabric combination or an all fabric, is with a good soap, plain water and plenty of elbow grease. And he gives an example (*Continued on page 82*)

ACTUAL TAKE-OFF, depicted below, is made only after pilot has checked mags, engine rpm and landing craft

THINK BEFORE YOU FLY

Flight Examiners are interested in the way you fly for that private license—and the way you plan as well

By Don Dwiggins

SO YOU want to be a certified private pilot? Take it from a Civil Aeronautics Administration flight examiner who has had the opportunity of check-riding several hundred private applicants since the new Civil Air Regulations went into effect, that coveted ticket is definitely NOT being given away with bottle-tops.

True, certain of the requirements have been relaxed, chiefly those pertaining to aeronautical knowledge. But you can slip to make your spots, precision spins are out and 45° will qualify as a "steep bank"—just be forewarned, before you can carry passengers legally the C.A.A. will give you a thorough going over on "airmanship."

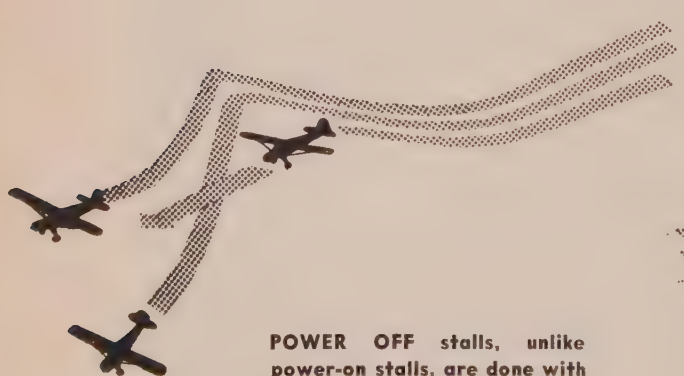
That quality known as airmanship is something you don't buy in a store. Neither is it something you must be born with—you must develop it while you learn, the hard way. And how hard you work at learning to fly will decide how much airmanship you can absorb.

Roughly speaking, airmanship is an ability to think in the air. Your check pilot wants to know whether or not you are planning ahead of the airplane, whether you are ready for any emergency that may arise—in short, whether you are at home in the sky, which is rapidly filling with thousands of new pilots being born.

In an effort to streamline the production of more private pilots to meet growing demands of post-war aviation, Civil Aeronautics officials last year took three important steps toward this goal.

First, the Safety Bureau of the Civil Aeronautics Board sent out proposed revisions of existing regulations. Second was announcement by T. P. Wright, CAA Administrator, that physical examination by any registered physician would be acceptable for a private pilot after June 1, 1945. Then, on April 26, 1945, the Board formally approved revisions of Sections 20, 43 and 60 of the CAR which became effective July 1, 1945.

Flight instructors were the obvious "fall guys" to be held responsible for maintaining high performance standards for private pilot applicants under the new schedule. (*Continued on page 84*)

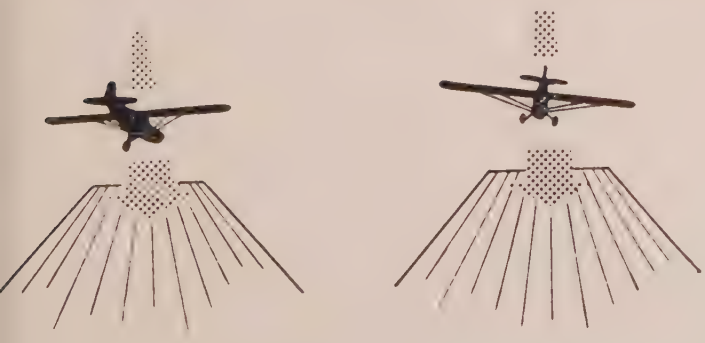


POWER OFF stalls, unlike power-on stalls, are done with fully closed throttle. However, both serve the same purpose.

POWER ON stalls for the Flight Examiner should indicate you know what a stall is, can see it approaching and can recover

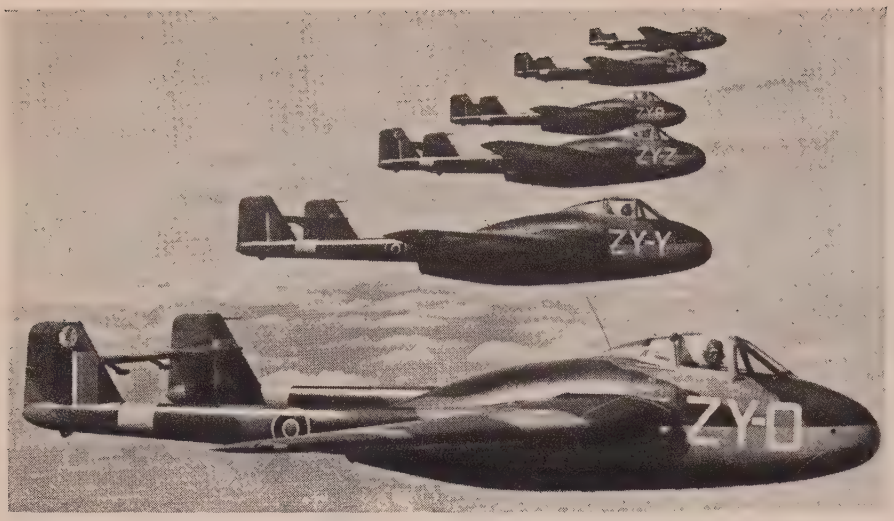
SLIPS CAN be used to make spot landings. In forward slip, *top*, flight path is forward—side slip, *bottom*, is sideways

SMOOTH FLYING won't get the private pilot his license. He must demonstrate airmanship —ability to "think in the air"



CROSSWIND landings need one of two attitudes to offset wind —crabbing wings level, *left*, or holding wing into wind, *right*

THE SPIN is required on check ride for private ticket—the recovery must be smooth, effective rather than on known spot



MODERN VAMPIRES by de Havilland, powered by *Goblin* turbojets, streak by in echelon formation. Besides RAF, *Vampires* are in service in Swedish, Swiss air forces

BRITISH AERO NEWS

By RICHARD PEARSE A.R.Ae.S.

POPULAR clamour has won a notable victory for civil aviation over here this month. In August, I was telling you of the enormous landing fees which were being levied at State-owned airfields. Strong representations against these exorbitant fees were made by the Royal Aero Club, protector of the private and touring pilot, and some pretty pungent comments were made in the aeronautical press—I suspect, also, that the F.A.I. during its recent conference in London must have had something to say about it. Anyhow, a few weeks ago, the Ministry of Civil Aviation announced new rates for landings ot light aircraft up to a total of 6,000 pounds. Many more airfields are open to use by private flyers, including military airfields. All we want now is better services at the airfields and more and cheaper light touring aircraft. Anyhow, the lowering of landing charges is a big step in the right direction for, as I mentioned last month, we have painfully few private aircraft registrations in this country. Many would-be private flyers were beginning to suspect that it was the intention of the Government to "freeze" them out of the air, in the rush to compete in the air-carrier market; they still have grounds for a certain amount of suspicion but this concession will dispel much of it.

Talking about private flying, the first flying club of its kind in Great Britain has recently been formed by the United States Embassy in London. The U.S. Embassy Flying Club has its headquarters at White Waltham airfield near Maidenhead, 30 miles west of London. Club secretary is Miss Virginia Lewis and a prominent member is, of course, Mr. Livingstone Satterthwaite, U.S. Civil Air Attache. The Club's fleet includes a North American *Texan* and three Piper *Cubs*.

The British European Airways Corporation is now getting an appreciable number of Vickers *Vikings* with which to replace its *Dakotas*. The Corporation has been able to increase the frequency of its services on certain routes but has announced that for "technical reasons" it has been necessary to divert the London-Zurich service to Geneva and, at the same time, an extraordinary position has arisen. Apparently, all the Corporation's aircraft are absorbed on other routes and they have "farmed out" the scheduled service from London to Geneva to a charter Company—namely Skyways Ltd. This has caused a good many people to scratch their heads in wonderment because, of course, under the Socialist Civil Aviation Bill, no private enterprise firm is allowed to operate scheduled services! Skyways is using *Dakotas* and Avro *Yorks* for the services and, being a thoroughly well organized concern, are running it with the utmost efficiency.

I expect that many Americans are puzzled at the British Government's decision to replace both the Minister of Civil Aviation, Lord Winster, and the Parliamentary Secretary, Ivor Thomas. We are puzzled too. You are lucky that your system in the U.S. allows Civil Aviation to be run, at the top, by men who are not only sound administrators but also men with wide, practical experience in aeronautics. Our system makes it essential that these men be political bosses and sound administrators. Our new Minister, Lord Nathan, and the Parliamentary Secretary, Mr. Lindgren, possess, no doubt, many admirable qualities but, so far as most of us are aware, aeronautical knowledge and experience are not included amongst these.

Work on the de Havilland 108, in the prototype of which Geoffrey de Havilland lost his life last month, is continuing and John Cunningham has been appointed to succeed Geoffrey as Chief Test Pilot to the firm bearing his father's name. Cunningham was a very successful night-fighter pilot during the recent turmoil and, in addition to being highly decorated, he earned for himself in the popular press the nickname of "Cat's-eyes" Cunningham—presumably because he could shoot so accurately in the dark. Nevertheless, he is an extremely fine pilot and has already gained a fairly considerable experience on the products of the de Havilland Company.

The fog season has started over here and already it has caused some cancellation of schedules. Since the tremendous run of accidents last month, we have been getting a bit "safety conscious" over here. Ground and airborne equipment has not reached the stage, as so many people think, where all-weather flying can safely be carried out and betting on the skill of the pilot is unfair to him and to his passengers. One of the major things which we lack, and my visit to the U.S.A. last summer makes me think that you do too, is efficient high intensity lighting—particularly Approach Lighting. Unless we are able to achieve this, we shall have to wait until we get 100 per cent efficiency in radio controlled automatic landings before we can indulge in all weather operation—and I think that will be a year or two.

In the matter of safety, the chairman of the B.O.A.C. had a Press conference during the month in which he stated that during 1945 the B.O.A.C.'s regular services had carried 143,676 passengers 25,214,448 miles, without fatal accidents to any passenger. It would be a good thing if the general public were given a lot more of this kind of information from the airlines on each side of the Atlantic. We are all getting more than tired of seeing airline accidents as headline news whilst very little prominence is given to the achievement side of the account. It might be argued that it should be unnecessary to publish figures of passengers-miles travelled without accident in these enlightened days of transportation. Nevertheless, in this country, railroad accidents generally get a small column on the back page.

Gliding seems to be growing more popular over here, possibly because it is cheap, is a grand sport, and is able to recapture some of the old flying club atmosphere of "flying for flying's sake." We should like to hear a lot more about your activities in this respect. Our own main problem is that of restricted air-space and, since a nice fat chunk of cumulus is so welcome to the soarers, domestic airline Captains are naturally inclined to view them with considerable, and I must admit, justifiable distaste.

One of the first cases of flying prosecutions since the War occurred last month. An air taxi ship was hired to fly a Press photographer over a cricket match at Manchester and was alleged by the police to have flown over the crowd at a height between 3 and 400 feet. Anyhow, the unlucky pilot and the photographer were each fined 80 dollars—not, as might be imagined, for flying dangerously but for flying in the vicinity of a concourse of people without the permission of the Minister of Civil Aviation. This is interesting because it is a new amendment to the old Air Navigation Order. In the past, it has generally been found too difficult for the police to prove any particular form of flying could be construed as "dangerous flying" so the authorities had to think up this one. Even though I am a pilot, I expect that many readers will agree—I cannot help feeling sorry for the passenger; he was not the Captain of the ship, but he had to pay his 80 dollars just the same.

Richard C. I. Pearse, A.R.Ae.S.

The FLYING SPORTSMAN

A Special Section . . . Sports in Season

SKI-HOLIDAY BY AIR

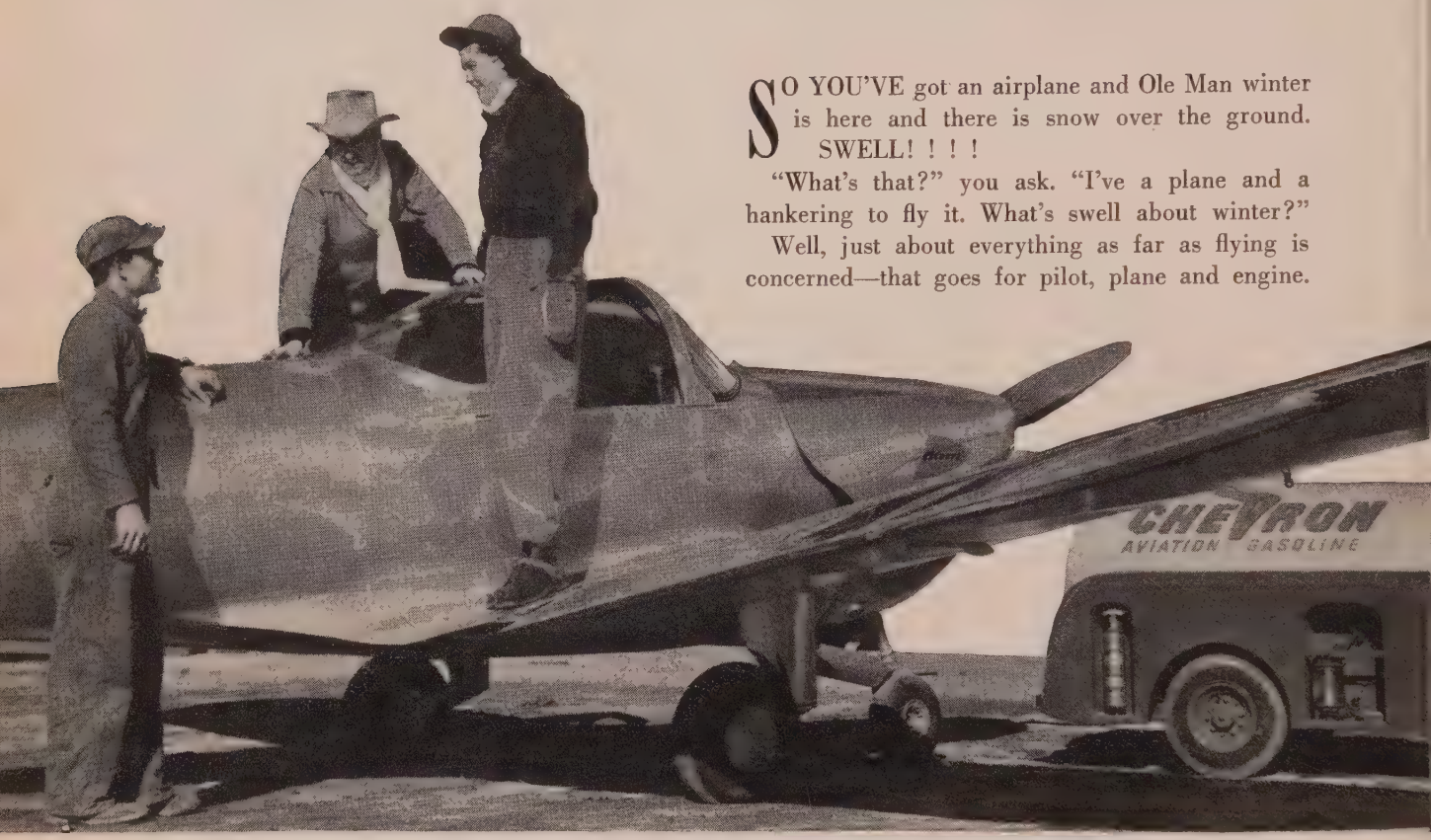
By BOB ARENTZ

Skis on your plane and skis on your feet a great combination for winter

SO YOU'VE got an airplane and Ole Man winter is here and there is snow over the ground. SWELL! ! ! !

"What's that?" you ask. "I've a plane and a hankering to fly it. What's swell about winter?"

Well, just about everything as far as flying is concerned—that goes for pilot, plane and engine.



BOB AND ZADA Arentz fly in from Idaho in their *Ercoupe*, chat with Dell Brimhall, foreman at Utah's Alta Air Park

DRINKING IN mountain splendor, Jan, Dave and Zada perch on rail of Alta Lodge, 8,500 feet above sea level

ZADA'S SKI LEGS get a brief work-out after a lapse of several years. Then off for the ski lift for a free ride

JAN LAWSON decides to take another whirl at it and gets a lift to top while the boys watch and wait turn

No thermal currents. No rough updrafts. No bottomless downdrafts. In high altitudes, there's relief from those endless take-off runs and none of that pooped-out, sluggish, hundred-foot-a-minute rate of climb in a soggy airplane.

The air is solid. Your wings and propeller get a good foot-hold for really keen flying enjoyment.

Unfortunately, many people think of winter as a time of storm and strife and forego the pleasure of flying under really excellent conditions when the weather is right.

Yeah, we know, winter storms—but you don't fly in summer line-squalls or thunderheads, do you? In the winter, act just like you do in the summer when you fly strictly for fun—pick your weather.

You'll find the engine runs better from the moist cold air and the heating problem is no longer one for the engine, but one for you—generally solved by clothing or cabin heating.

Okay then, what's to do?

That's up to you. If you live in snow country and can afford a pair of skis, quickly attached and detached from your wheels without any effort or time loss, you are double-lucky, because then every field becomes a paved airport and the forced landing worries that continue to plague too many pilots are practically nil.

For flying to places in the winter, skis can't be beaten. You'll want a pair of snowshoes in the ship if you do a lot of kiting around in the back country, but it's a wonderful feeling to know that

ZADA LOOKS down the slope carefully, lacking careless abandon of Janet and Dave who are in ski practice

a rocky ridge that would raise hell with you on a summer landing is glass smooth with five feet of winter snow and if it's packed solid you won't need skis on your plane.

It is not against the law in most states to land (in the summertime) on a lake shore to go swimming, or in a friendly rancher's mile-square field for some pheasant shooting. In Idaho they pay off on skis by landing on frozen lakes, and one really swell winter trip is landing on Jackson Lake near Moran, Wyoming, in the shadow of the Tetons where you can catch more fish through holes in the ice than your plane will carry out of the valley. Trout, too, up to five-pounders.

But if skiing is your winter dish, don't stack the airplane on its nose when you get ready to wax up the old slip-sticks. Just put an extra pair on the ship and fly to your favorite ski resort.

Be cautious about two things—weather that looks soupy and has icing possibilities; and don't fly up the canyons to ski lodges which are eight and nine thousand feet above sea level. We don't mean valleys, like the one into Hailey, Idaho, where a fine year-round field will let you land on wheels within 15 miles of Sun Valley, Idaho. (But check field conditions, like at Boise or Pocatello, on the way just to make sure a storm in recent days hasn't closed it temporarily.) We mean *canyons* with narrow, rocklined walls that come close together.

If you are within 300 miles of a good ski resort and there is a field within 10 miles of it, then the airplane is your ticket, and like we said, if you have snow at home and a pair of skis, then the world is your paved runway in the winter-time.

For instance, a good pilot with skis on a *Cub*, a Luscombe, a *Callair* or similar ship, can land almost as close to the Sun Valley lodge as you can drive a car—within a hundred yards.

At the magnificent Alta Lodge in the Wasatch Range just a few miles south and east of Salt Lake City, Utah, you'll find some of the best skiing in the world, and less than 10 miles distant, in open valley country with excellent approaches, you'll find the Alta Air Park, a year-round private airport that has just been opened up.

This is a single strip at present, but so sheltered by its location that wind conditions are either calm, or directly north or south. That's how the 3,000-foot runway goes, too.

The operators are Ray Brimhall, Robert C. Madsen and Curtiss T. Ellsworth and they will have a two-story administration building with pilot's lounge and restaurant as (*Continued on page 81*)

SOUP'S ON, come and get it. "Pop" Arentz has prepared for inner man. Hungry skiers make short work of soup, tea with spot of lemon juice, then take sun bath on a glass enclosed patio before skiing again

OVERSHOE SKIS for Winter Flying

Skis that slip on over plane's wheels make change-over from summer to winter operations an easy, safe, inexpensive matter

SKIS, designed by makers of the *Callair*, are easy to carry because they weigh only 20 pounds. Plane is wheeled out of hangar, skis fitted over wheels. Taylorcraft is pictured here

SHIP is lined up so that when wheel is raised, the ski can be slipped under wheel. On a small ship, the task is an easy one for one man. On larger plane, a helper would be needed

PLANE OWNER in this case is holding the ship up by bracing his back against the strut. With wheel lifted off the ground, he slides the ski under and in place with his right hand

WHEEL placed in the shoe of the ski, the plane owner then straps the ski on securely by an approved-type (CAA) safety lock. He is now ready to fasten a ski on the other wheel

JOB DONE, and in just a couple of minutes' time, too, the airplane is ready for operation over snow-covered countrysides. These skis are as easily taken off as they are fastened on

PLANE TAKES OFF at dawn to hunt in early hours. February and March are best months. Pilot Dick Ballantine searches out next coyote to meet his fate. Oregon's sky hunters see cattle which benefit from hunting

SKY HUNTING IN OREGON

Ranchers are grateful for the highly successful air drive against coyotes

By M. BROWN

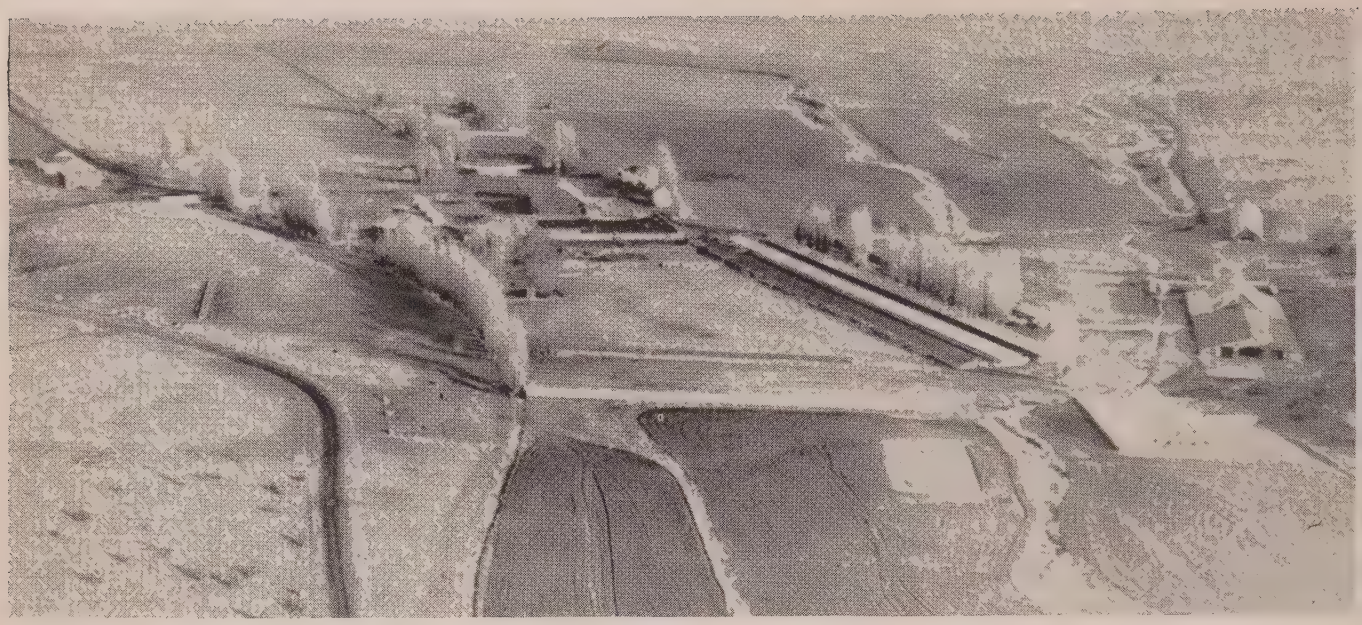
WHIRRING through the early morning skies over eastern Oregon's vast game areas, above stock ranches and range lands, then dipping low to skim the ground when their prey comes into view, lightplanes are daily dealing destruction to marauding coyotes, those vicious little animals that prey on Oregon's wild game and the rancher's domestic livestock.

This aerial fight against the wild dogs of the prairies was started in the winter of 1945. It proved to be so successful that it was chosen "accepted procedure" in the yearly struggle against the coyote. A. V. Meyers, biologist for the Oregon State Game Commission, and himself a pilot, was one of the first to have faith in this method of destroying the devil dogs of the prairies. And it was largely through his efforts that a rather large-scale program of aerial coyote control was at last started. And it wasn't easy.

The stockmen of Oregon were quick to doubt the effectiveness of using an airplane to hunt down and destroy the coyote. Also, they seemed to agree that the use of a plane for such a task would bother the cattle and sheep. But it didn't take long to dispel those fears. Not only were the first hunters successful in getting rid of many coyotes but they also proved that the cattle and sheep paid less attention to the "noisy" planes than they did to a pesky fly. The result was just as Mr. Meyers had predicted: stockmen, either individually or collectively, immediately began hiring planes to hunt coyotes and to provide aerial protection for their many thousand heads of cattle and sheep.

A locally established flying contractor was the first to be called in on this coyote control project. And the experience this one contractor gained in a single season's hunting has made him a valuable friend to the entire region's ranchers and stockmen.

PILOT DICK BALLANTINE *(top)* and gunner Vernon Giles examine choice coyote pelt. Pilot Roe Davis displays coyote stopped cold with one shot. Ranchers Mr. and Mrs. Avon D. Derrick entertain the pilots *(left)*



HAY CREEK ranch, with some 5,000 beef cattle is example of large ranches which benefit most from Oregon Game Commission's aerial coyote hunting program, which has sharply reduced losses suffered by cattle from coyotes

His being ready on short notice to take up the fight against the coyote has placed him in a "country category" that is similar to the city's police department or fire brigade.

During that first year's aerial hunting, the state of Oregon paid for 258 hours of flying. Local interest has since financed about 500 hours more. It's an exciting job—sky-hunting—and an exacting one, both from the pilot's standpoint and his gunner's viewpoint. Light, conventional aircraft of less than 100 hp are used, with perfect piloting and close coordination between pilot and gunner essential to success—not to mention to a safe return home.

Three pilots have been carrying on this work. They are Dick Ballantine of Roberta Field, Redmond, Oregon; Oscar Davis of Burns in Harney County; and A. J. Tilse, Ben Airport operator. And the job these men have done has not been without its share of thrills and excitement.

On a recent flight from the CAP airport at Redmond, Dick Ballantine and his gunman, Vernon Giles, took off at dawn. Soon stretched before them the irrigated farms of central Oregon, then came the expansive ranches with their great herds of Hereford cattle and bands of sheep. Finally, out below stretched the range (*Continued on page 86*)

HOSTS TO Oregon sky hunters are Mr. and Mrs. Derrick of Fort Rock, here seen riding after cattle on their Lake County range. They can usually be counted on to have the boys in for a cup of coffee and a chat about their luck

GAME SEASON IS STILL OPEN IN MANY STATES

MANY FARMERS ALLOW HUNTING But You Must Ask Them First

The flying sportsman whose travel to remote hunting spots has been restricted throughout the past few years may well forget some of the rules of the game in his enthusiasm to get into the woods.

One of the easiest paths to happy hunting grounds, and one which is too often forgotten, is the simple courtesy of asking permission before hunting on private property, especially posted land. Most farmers will gladly allow you to hunt their land, if you ask, but most, also, are justifiably angered if you do so without asking. Farmers are friendly fellows, and only ask that you accord them the same courtesy you would give a fellow apartment dweller before barging into his domain.

For your own protection, also, it is wise to take such precautions, since if there are other hunters out it is well to be on your guard. That red cap is not infallible.

And don't, by any means, bring your plane into that lush looking green field down there, just because it is nearer your destination than the airport—chances are that it's a field of winter wheat, which, besides the damage you may do to your plane, will cost you a tidy sum for the damage done to the field, and an incalculable sum in loss of good-will between farmer and hunter.

LAW GOES MODERN

A contemporary note has somehow crept into the traditional classicism of the whereas's, wherefores, on off by or froms, of the hunting laws of many states. Most of us know that it is illegal to shoot from autos or highways but how many know that a number of states now have incorporated into their laws the same restrictions applied to planes? It is now illegal to shoot from a plane. (This does not, of course, apply to pest control, which is quite different from hunting for fun.) It is safe to say that before very long, the few remaining states will add this restriction to their law, and then woe to the hunter who can't wait to get on the ground!

Flights Offered to Hunters

The first postwar commercial hunting flights have already begun, and can be expected soon to merit a regular place on all flight schedules.

Capt. Carl Krogmann, president of Potomac Airlines, announces successful experimentation with a "Package Air Tour" for a group of businessmen last September. The party left Washington, D. C., early Saturday, and arrived in Chatham, New Brunswick, less than six hours later. The return flight on Monday allowed two full days of angling on the famous Miramichi waters for the normally desk-bound rotarians, and 14 out of the group of 16 landed good-sized Atlantic silver salmon. Capt. Krogmann expects to make his package sportsmen's tours a regular feature of the fishing and hunting seasons.

The Manteo-Ocracoke Airline, operating out of Roanoke Island and Beaufort Airport in North Carolina, began its "Waterfowl Special" flights in November, carrying duck hunters from the mainland to the marshes of Ocracoke Island.

Eastern Air Lines began the trend ten years ago with their Flying Fisherman Club, and now have plans made for a companion Flying Hunter Club. This company offers trophies and certificates for catches, as well as a Conservation award. Colonial Airlines are known for their ski-plane trips, with skis carried free. Western Air Lines allows extra baggage allowance for visible sports equipment, and is planning special sport tours.

HUNTERS SOLVE problem of bringing game home. H. F. Troxel (right), of Portland, and W. L. MacAdams, of Boston, strapped deer to floats for trip home from Nova Scotia

Fishing, Big and Small Game Available

About the same time they take down the denuded Christmas tree, many sportsmen retire to the library fire and do their hunting and fishing in retrospect. While it is true that the bulk of the seasons are over (or not yet begun), still, there are places where the rod and gun may be used.

Whether the flying sportsman prefers deep-sea fishing or fresh water angling, big game hunting or flushing quail, he can fly directly to a spot somewhere on the continent and find sport to his taste in the slack months of January and February.

The big game seasons last but a few days in November or December in most areas, but here and there you may stalk the big ones a little longer. The Northwest Territories and Yukon, in Canada's snowy fastnesses, boast Deer, Moose and Caribou hunting through February. Saskatchewan also allows Caribou hunting. Elk may be shot in the Quinalt and the Elwha areas in Washington through February, and Bear hunting goes on in Alaska, Newfoundland, Nova Scotia, Northwest Territories, Georgia, Maine, New Hampshire and Wisconsin.

The hunter in quest of small fur-bearing animals, such as mink, opossum, raccoon, weasel, otter, muskrat, squirrel, rabbit, can hunt in Manitoba, Northwest Territories, Alaska, Alabama, Colorado, Delaware, Georgia, Florida, Iowa, Kentucky, Louisiana, Maine, Maryland, Michigan, Nebraska, Oklahoma, S. Carolina, Tennessee, Vermont, Virginia, Washington, W. Virginia, Wisconsin.

Through January, and in some places into February, it is legal to hunt Quail in Alabama, the Carolinas, Florida, Georgia, Louisiana, Mississippi, Tennessee and Vermont.

Some Fishing Is Allowed

For the fisherman, there is trout the year round in some sections of Wisconsin. Excellent fishing is found all year in such far-flung areas as the Virgin Islands and Newfoundland. Other states which allow some fishing these first two months are Delaware, Florida, Kentucky, Massachusetts, Minnesota, New Hampshire, Oklahoma, Ohio, Oregon, Pennsylvania, Tennessee, Utah, Virginia, Washington, Wisconsin.

If you are flying your own plane into these places, especially if you are unfamiliar with the territory, it is a wise precaution to file a flight plan with CAA, just in case you are forced down unexpectedly close to a bearden or a trout's favorite rock. And it is also wise, imperative, in fact, to be sure that your license is in order, and that you know the local laws where you are hunting. The local constabulary is usually unfriendly to infractious furriners. A brief letter to the Department of Conservation, usually located in the capital city of the state you plan to hunt, will bring you all the necessary information to make your trip both enjoyable and legal. (*Continued on page 93*)

Dilbert *stretches* his glide to get in. . . .

And doesn't use *all* the field getting out!

DILBERT

By S. H. Warner and Robert C. Osborn

The Higher The Faster—Careless pilots are apt to become Dilberts the first time they operate out of high-altitude fields. Here are two who did. During a cross-country, the first one, with 450 hours solo, made a good landing on a field at 6,000-feet elevation. After a run-out of normal length, he unlocked his tail wheel and started to turn off the runway. He was still going so fast, however, that he went into a violent groundloop and nosed over.

The other one, an air freight pilot with 2,000 hours, was flying a twin-engine job. He bollixed his take-off at a 6,500-foot airport. He had just gassed and was loaded almost to capacity. Although both engines operated perfectly, the airplane did not become airborne until well past mid-field on the 9,000-foot runway. The plane then gained altitude so slowly that the pilot was unable to clear obstructions at the end of the field. Fortunately, he lived to profit from this lesson.

There was nothing mysterious about the cause of either of these accidents. Unless you are prepared for the changes in operating characteristics of your airplane when using high-altitude fields, you will probably end up the same way. It is all due to the decrease in air density up there.

Air decreases in density in direct proportion to the increase in altitude; therefore wings give progressively less lift as altitude increases. This decreased lift increases your stalling speed, necessitating faster landing speed and a longer take-off run to build up to flying speed. Also, unless your engine has a supercharger, you will find it impossible to take off as heavily loaded at altitude as at sea level and your rate of climb will be slower—largely explaining the air freighter crash.

Tests have shown that for each 1,000-foot increase in altitude above sea level, approximately 3 per cent longer run is required for take-off.

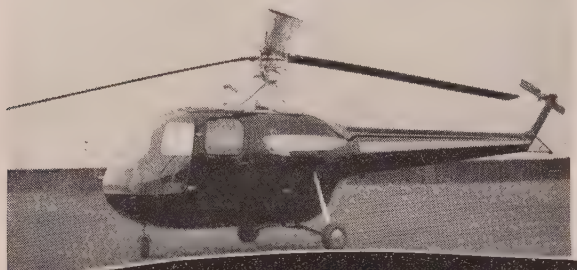
Since air density also is affected by temperature, a word of warning on this subject is in order. The higher the temperature, the less dense the air, with the same effect on airplane operating characteristics as from altitude. Approximately 3 per cent longer take-off run is required for *each* 10°C rise in temperature. Official flight characteristics of aircraft are based on sea level and 15°C air temperatures.

For once the pilot gets a lucky break on this air density problem. The reason is that the airspeed indicator is calibrated for sea level and 15°C and since it is actuated by the same air density as that which affects the airplane, it automatically shows how much extra airspeed is required. In other words, safe take-off and landing speeds, as registered on the airspeed indicator, will always be *the same* at any altitude or temperature.

All that is left for you to remember is that because your stalling speed is increased, you will need a longer take-off run to build up to flying speed, a longer distance for the run-out after landing, that you can not take off as heavily loaded and that your rate of climb will be slower. Simple, isn't it? But don't forget it! (*Continued on page 88*)

XFJ-1

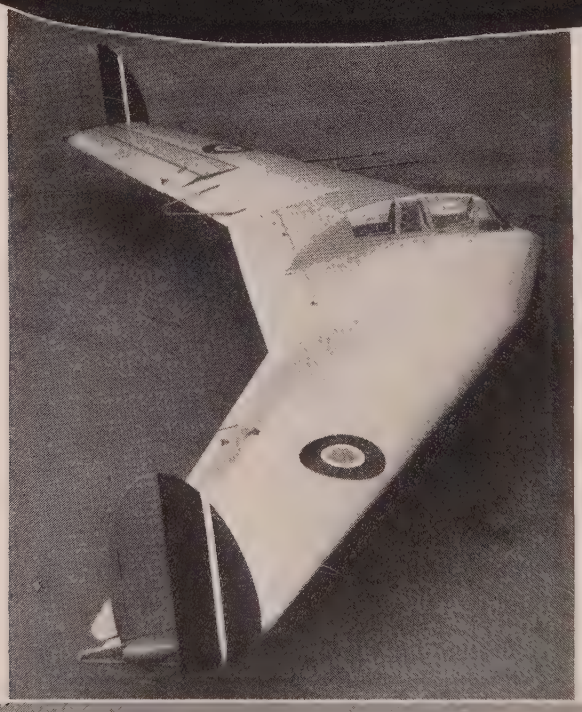
New jet carrier-based fighter for Navy is this North American counterpart of Army Air Force's XP-86, both of which have been flight tested. XFJ-1 is first Navy fighter to employ the General Electric TG-180 through-flow turbojet with multi-stage axial compressor (4,000 pounds thrust). Speed, 600-mph plus.



SIKORSKY S-52

This two-place helicopter sports a tricycle gear and three all-metal rotor blades. Powered by Franklin engine which delivers 178 bhp at 3,000 rpm, S-52 will cruise at 85 to 90 mph, can be "pushed" to travel better than 100 mph. It climbs at 40 mph at rate of 1,500 fpm. Gross weight is 1,750 pounds.

NEW... on the wing



A.W. 52G

This tailless glider, built by Armstrong Whitworth was demonstrated at Society of British Aircraft Constructors' sixth show of British aircraft-engines-accessories at Radlett. Designed as a flying model of large powered aircraft, 52G carries crew of two, is towed to height of 16,000 feet for trial flights.

CONSTITUTION

Lockheed's 180-passenger low-wing monoplane is double-decker. Four Pratt & Whitney *Wasp Major* engines furnish 12,000 hp (total). Plane has wing span of 189 feet, is 156 feet long, is 50 feet high at tail. Due to 10,000-gallon fuel capacity and 300-mph cruising speed, range is nearly 7,000 miles.

HIGH vs. LOW

HIGH WING—J. David Finger

J. David Finger

OUT of my two thousand-odd hours of flying perhaps a hundred or more have been logged in low-wing aircraft, not for lack of opportunity, but because I prefer the high-wing type to the low-wing. Personally, I consider that the high-wing type of aircraft has so many advantages over the low-wing that there is really no comparison. For example: the high-wing model is easier for ladies to enter.

The doors of a high-wing give much less mechanical trouble than the sliding hatches and canopies and hinged bubbles of the low-wing types—and the cabins are usually much quieter.

The high-wing models seem to have a better cabin layout, due to the square top of the fuselage, thanks to the wing overhead. This wing not only provides safety during a possible nose-over, but gives welcome shade in summer. Pilot and passengers do not roast to death in summer under a plastic canopy or bubble, common to low-wing aircraft. The high-wing also gives better visibility below, a definite advantage for sightseeing, and a money-making point for charter operators. (*Continued on page 87*)

LOW WING—Lt. Col. W. L. Weitner

W. L. Weitner

PERSONALLY I like the low-wing type aircraft for the following reasons: Better all around visibility, a most important factor especially near crowded airports, is generally present in low-wing design. The low-wing makes possible a practically full view in all directions, especially toward the most common "danger-approach angles" of slightly above from zero to 360 degrees around the airplane. The fact that the low-wing covers a portion of the ground directly below hardly hinders navigation, since the wing may be dropped easily by a flick of the controls. This small portion of obscured view is therefore in the "safest" direction.

Low-wings provide greater accessibility to and from the cockpit. They provide a step into the ship without the physical exertion and acrobatics common to other types—also there are no struts and wings at head level to provide bruises and lacerations to the not too careful or familiar passenger.

Speed and over-all efficiency are higher as a result of the internally braced wings of the low-wing in contrast to the (*Continued on page 87*)

AIRMEN OF THE JURY

This is YOUR page for debate on all sides of the many phases of the aviation picture. Here, airmen of all ages and "hours" may hear the pros and cons of arguments old or new, the question of the merit of designs, equipment and procedures of interest to you all, and then express YOUR views via the coupon at the bottom of the page. The value of this page to you and the industry will be in proportion to the number and enthusiasm of the "Airmen of the Jury" who take active part in each "case." Results of the readers' verdicts will be published in a coming issue after careful tabulation. Each month a new "case" will be presented. This month the LOW WING meets the HIGH WING. Next month the PUSHER PROPELLER meets the TRACTOR PROP. Here are the verdicts of two airmen. AIRMEN OF THE JURY, WHAT'S YOURS?

AIRMEN OF THE JURY

This is your ballot on the case of High Wing vs. Low Wing

I favor HIGH WINGS____ I favor LOW WINGS____

BECAUSE:_____

_____

_____

_____

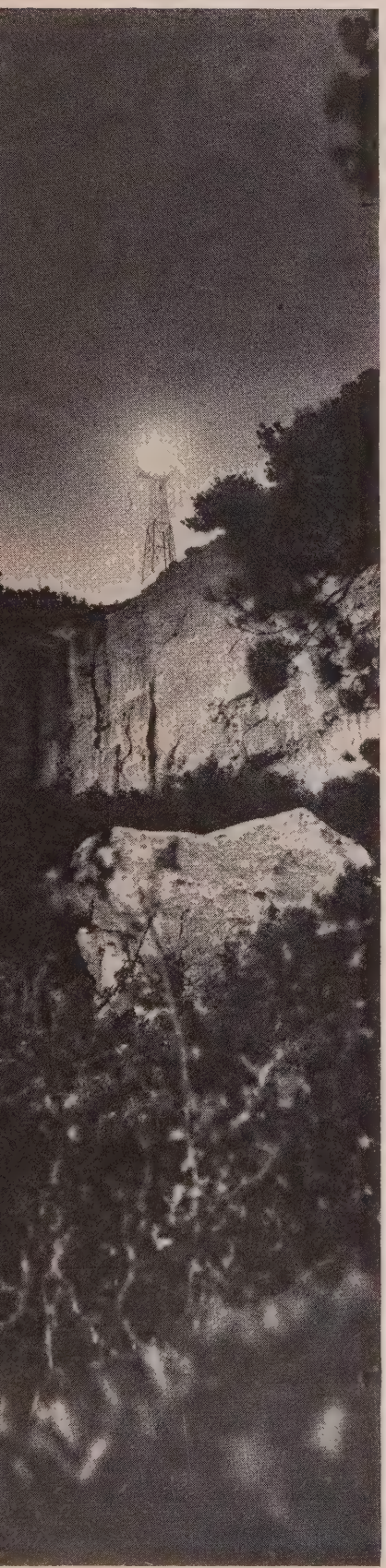
_____

Name_____ License Number_____ Hrs.____

Address_____ City_____ State_____

Do you own a plane?____ Make_____ Type____ H.P.____

AERO-LIGHTHOUSE KEEPERS



STILL a welcome friend of all pilots in this day of radio and radar navigational aids is the old fashioned lighted beacon all along the airways.

Dotted along the nation's airways, somewhere between 10 and 20 miles apart, at the airports, and on the crests of dangerous mountain peaks, a total of 2,151 beacons flash their nightly greeting to the planes overhead, commercial, private and military.

The route beacons, in addition to their fixed course lights, wink out in code the distance to the next airport, while the obstruction lights flash over and over again in red their warning for pilots to keep clear.

Keeping these beacons in operation is a staff of more than 750 men of the Plant and Structure Maintenance Division of the Civil Aeronautics Administration. Unsung and unpublicized, these men perform a service as vital to pilots as the Lighthouse Service of the Coast Guard is to the men who pace the bridges of ships at sea.

With most of the nation in the grip of winter, these men have once again donned their fur jackets and snow shoes to trudge through waist-deep snows and over sheer cliffs to make their monthly maintenance calls at the beacons.

Armed guides have to accompany them to more remote beacons in the wild, mountainous areas of the northeast and northwest. Weather and terrain are not their only enemies; wild animals are a constant menace.

Some days the men arrive at the beacons only to be stranded by a blizzard which may last for days. For protection against such contingencies shelters have been built in the bases of some of the towers, while shacks have been constructed near others. Most of the shelters have doorways at several levels so that the workers will not be trapped by the depths of the drifting snow. In addition to their tools and spare parts the maintenance men have the added burden of food to carry with them.

At least one visit is made each month to check the motors which turn the revolving light and to check the supply of acetylene gas. Some beacons tap a commercial power line, while others have their own gasoline generators. If a passing plane reports that a beacon is not functioning, a man is dispatched to find out the trouble and get the light back in service. (*Continued on page 92*)

By A. A. HOEHLING

AIRWAY BEACONS—lighted lifeline of pilots between sundown and sunup—are kept operating by staff of 750 men. Located in out-of-way spots some beacons are hard to reach

Flying Fireman

(*Continued from page 16*)

game of strategy, a race for time, a fight to outwit the elements.

At the very moment the smokejumpers were swinging downward in their 'chutes, fire trucks from the Missoula forest ranger station were racing in the direction of the reported fires. Covered trailers carrying a ground crew and fire-fighting equipment to cover the main line of attack were being rushed to the scene. Even a team of mules to take over the work where the trail ended and the trucks have to stop were being carted toward the area. But the Missoula mountain terrain was impassable, even to the mules. There were precipitous up-and-down slopes, ravines it would take hours to cross. And minutes counted. So as the mules, men and trucks stood by, the smokejumpers, working in pairs, did their stuff.

Using equipment parachuted to them from the plane that had brought them in, the smokejumpers began to battle the blaze. Their equipment consisted of pick-axes, pulaskis, gas masks, short-wave radio and, of course, rations. While food is important, one of the other most important items in the fire-fighters' equipment is that short-wave radio. From the moment the smokejumpers hit the ground, they are expected to keep in touch with the pilot of the plane that brought them in. Contacting the pilot of the circling plane, the smokejumpers report on each lap of the struggle to put out the fire. In turn, the smokejumpers receive instructions from the group leader, and information of the work of crews fighting other fires in the vicinity. This information is vital and often life-saving to the smokejumpers on the ground. Without this radio contact, a smokejumper literally could be caught between two fires.

The boys that jumped to fight this fire were all college men, recruited from some of the leading colleges in the West. They were the pick of the crop—in top physical condition, intrepid, loyal, intelligent. It took men like these for this work, for the tradition of smokejumping called for men who put out a fire so it never rekindled again; men who never refused to jump. That was the score in 1940—it's no different today . . .

Before the men are allowed to jump, however, every precaution is taken for their safety. Their 'chutes are checked; so is their gear; the pilot selects the most likely spot for their descent, then as he hedgehops over the treetops, a piece of burlap is dropped to determine the velocity and direction of the wind—the possible path of fire. Then the men are given the signal. They hurtle into space.

In case of his landing in a tree, or some inaccessible mountain crag, each man carries in his personal gear a coil of stout rope and a knife. With a parachute perhaps hopelessly fouled in the branches of a tree the smokejumper still can cut himself loose and let himself down.

After the men have landed their equipment is 'chuted down. But the fact that supplies are parachuted down does not always mean that smokejumpers get them. Sometimes bears and 'coons beat them to it, which sort of gives one an idea of the type of country these men work in.

The progress of a smokejumper is perforce slow. There are fallen trees and unexplored jungle all around him. There is the fighting and grubhoeing of flaming underbrush, to check the fire and insure their own retreat. There are radio reports, and the figuring of the way back to civilization. There are no trails or landmarks. Radio and air coverage help, still it is these boys' own ingenuity that brings them back through unexplored terrain. The six boys dropped in the August, 1940, Missoula mountain fire got back in the nick of time, though the forest was considered practically impassable up to then. Just the six of them saved the government over $30,000 in valuable timber, almost three times the cost of the smokejumping project championed by the Forestry Service.

The spectacular performance of those boys convinced the government that a force of at least 40 jumpers would be justifiable. But appropriations permitted only a crew of 26. To cut expenses, the Missoula unit took over the entire project as well as the obligation to jump to fires in the adjoining parts of the neighboring regions—Fourth to the south, and Sixth to the west. After the training was finished, one squad was kept at the central Missoula camp, and two others were moved to the backwoods airstrip.

In 1941 heavy rains prevailed for several months and the critics began to howl that firefighting training was an idea of alarmists. Then just at that propitious time one of the worst fires in the history of the region broke out in the Flathead Forest. A small force of smokejumpers, without help from ground crews, put it out on 15 blazing acres. Again the government was saved $40,000.

Came 1942 and shortages of money, equipment and manpower. A 40-man crew was still the project. By painful saving, another squad was trained. But the equipment situation was tragic. It was possible to continue the program only because the Army released some 'chutes. They were converted for fire work by addition of slots and guide lines which made them more maneuverable, slower in descent. The harness was remade so that it could be slipped off in a single motion.

In September, 1942 a holocaust swept the mountain country in the Bitterroot forest region. The small force of smokechasers jumped for days, saving $66,000 in timber and putting out 31 fires. At this point the government began looking on the project with greater interest and was more than willing to go all out appropriation-wise. But the bottom of the manpower barrel had been scraped. The only men available for fire work were kids under 17 and old men with wobbly knees. The Forest Service would have none of them. Stymied, but not discouraged, the ingenious forest rangers hit on a new idea. They started using conscientious objectors as smokechasers. Mennonites, Brethren, and Friends—also a sprinkling of 4F's—now jumped to fires.

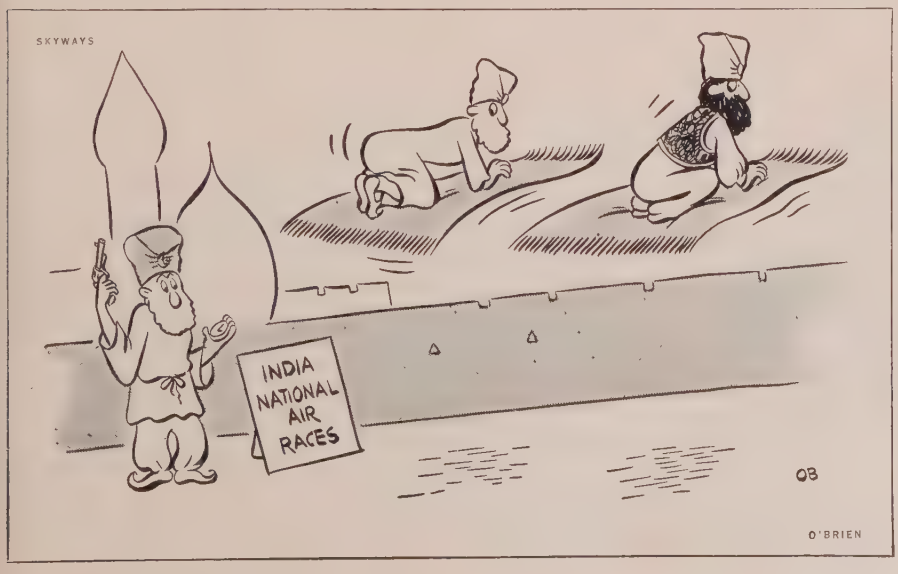
During the Spring of 1943, Seeley Lake, 60 miles from Missoula, Montana, became a national center for training of 'chute riggers, jumpers, and firemen. By mid-July, six squads had been trained. Thirty preliminary jumps are needed before a smokechaser is permitted to actually bail out. Training of extra men could not have been more timely. One of the worst fire seasons the Northwest had seen in 30 years was 1943. Forty-seven fires were handled by smokechasers in Region One alone, with the resulting saving to the government of $75,000.

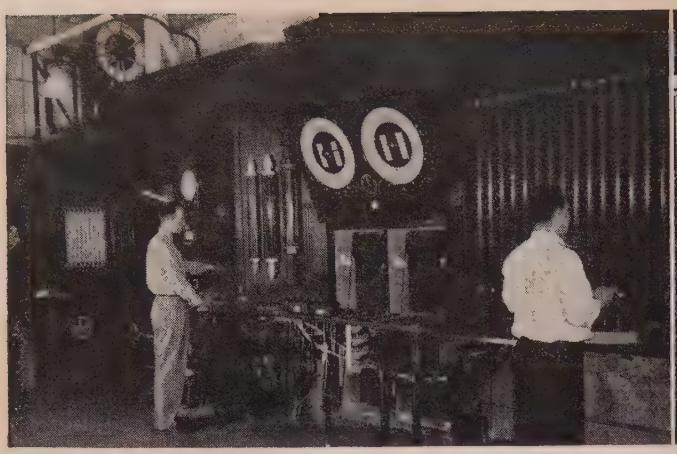
The use of planes for controlling forest fires actually dates back to 1925. After years of experimentation, this is the technique which emerged from individuals' battling fires in inaccessible terrain:

First the fire is spotted by a ranger. He notifies the dispatcher. The dispatcher phones the Missoula airport. Missoula alerts auxiliary ground strips closest to the fire where smokejumpers and ground crews go into action. Since smokejumpers form the advance guard, ground crewmen help them to dress, pack 'chutes, rig supplies, before they take off. Usually a C-47 is used as transport.

This year, 220 men will be trained at the Region One forest service camp, 35 miles northwest of Missoula. About 150 will be used in Region One—all of Montana, Northern Idaho, and Eastern Washington. Region Six (all of Oregon, and Northwestern Washington) will have 15-man crews of jumpers at Winthrop, Washington, and Cave Junction, Oregon. Region Five (the national forests of California) will have 10 men at Cave Junction also. Region Four (Utah, Nevada, and southern and central Idaho) will have 30 jumpers at McCall, Idaho.

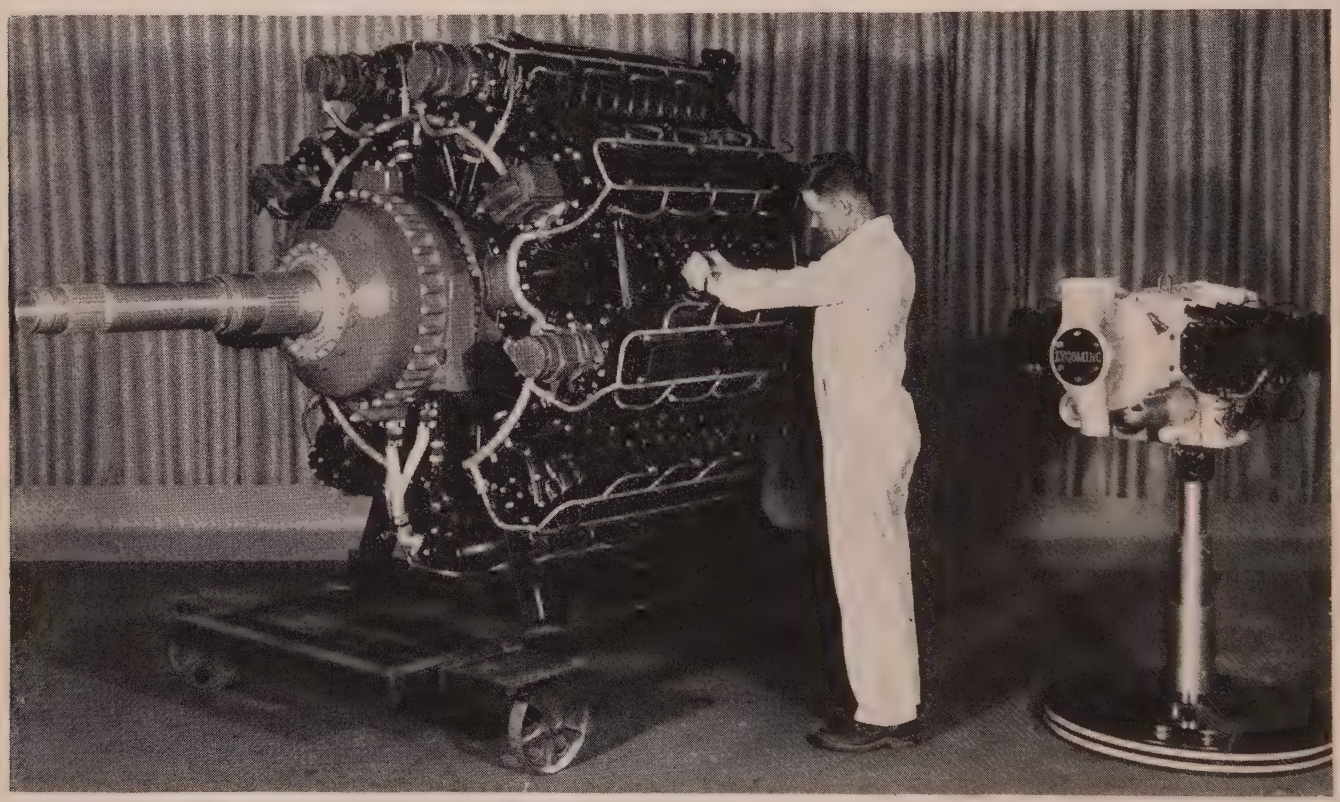
Though a dangerous job, a smokejumper's work has amenities. It pays about $2,000 a year, offers plenty of chances for self-education. But the code calls for such musts as no drinking, and curfew at 10 p.m. So if you are hell-bent for wild adventure, think twice before you decide to chase smoke.



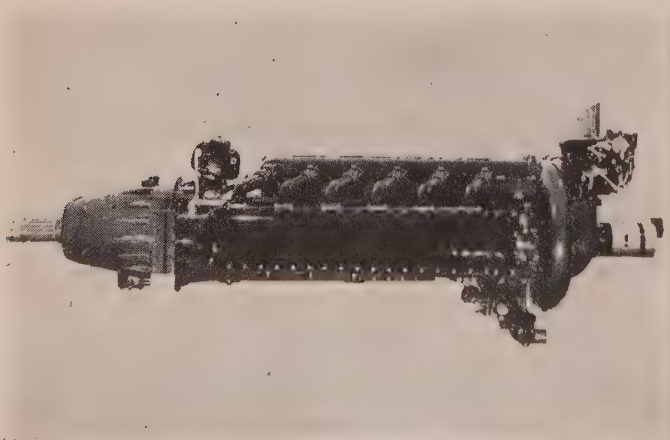


TECHNICIANS test engines in control room at Lycoming's new engine laboratory, using huge 7,200-hp dynamometer

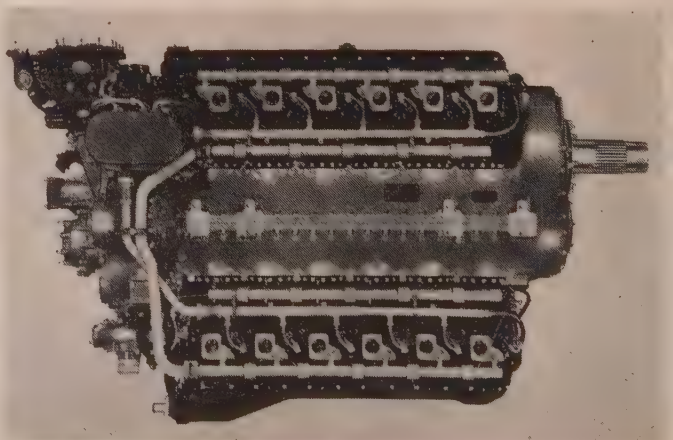
AIRCRAFT ENGINES ranging from 65 to 7,000 horsepower can be tested in Lycoming's laboratory at Williamsport (Pa.)



WORLD BIGGEST reciprocating engine is the Lycoming XR-7755 (X-7 for short) which develops 5,000 horsepower for take-off. The X-7 has 36 cylinders in four banks of nine each. A 65-hp flat-four light engine is shown at right



FIRST STEP in evolution of the big X-7 was Lycoming's XO-1230 12-cylinder 1,200-hp engine developed in 1937



H-SHAPED Lycoming XH-2470 24-cylinder liquid cooled engine, rated at 2,400 horsepower, flew in the Vultee XP-54

AAF's Seven-League Boots

Reciprocating engine still very much in picture for long range operations

IF ALL the king's horses were harnessed together would they be able to pull as much as Lycoming's XR-7755, world's biggest reciprocating aircraft engine? A cool 5,000 horsepower, it says here. Six of these giants, weighing 6,050 pounds apiece and measuring 10 feet long, 5 feet wide and 5½ feet high, would boost the 10,000-pound payload of Army Air Force's huge Convair XB-36 by some 500 per cent, or they would increase its range with normal payload to 11,500 miles. AAF planners also see the possibility of designing new *ultra* long-range aircraft which, powered by six or eight of these big engines, could fly non-stop around the globe.

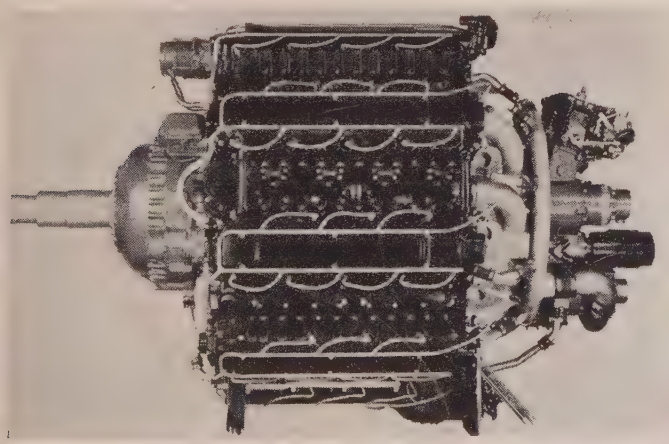
The announcement of this huge piston engine at this time is of special interest in the light of the widely expressed opinions of leading power plant engineers that ". . . except for engines in the low-power bracket, say up to 250 hp, the gas turbine is slated to take over the job of powering aircraft within the near future." Certain facts do bear out this opinion. Great Britain, the country which has taken the lead in the aircraft turbine field on the basis of Whittle's insight and tireless efforts in inventing and pushing the gas turbine for jet propulsion, has definitely hitched its wagon to the turbine star. At least one of our big American engine manufacturers has ceased all research and development on new, bigger piston engines and is concentrating on development of turbine and rocket power. Engineers insist that the multiplication of cylinders and the scores of thousands of moving parts in the reciprocating engine has run into the law of diminishing returns and a halt has to be called somewhere. (In England they thought this stop would come with the 18-cylinder Bristol *Centaurus* (2,400 hp) and the 24-cylinder Napier *Sabre* (3,000 hp), and it probably will. In the U. S. a lot of people thought the Pratt & Whitney 28-cylinder *Wasp Major* (3,500 hp for take-off, capable of ultimate development to at least 4,000/-4,200 hp) would be the last of the big "up-and-down" engines). Finally, as the simple steam turbine supplanted the complicated steam engine for many purposes during the last century, so it is expected that the gas turbine with its single rotating part will supplant the gas engine for most purposes in this century. And there you have it. As a matter of fact it's mostly right, but at the moment this neat theory stumbles against an awfully big hunk of metal. This huge Lycoming engine roars "T'aint so!"

Under present conditions the gas turbine takes such a whale of a lot of fuel it just isn't in the picture for *very* long-range operation. And this is where the X-7 (short for XR-7755) comes in. Range is its middle name. According to Colonel Ralph L. Wassell, Power Plant Division, Air Materiel Command, who gave a little spiel about the big engine when it was unveiled early in November at Aviation Corporation's Lycoming plant in Williamsport (Penna.), the distinctive thing about the X-7 is its two-speed gear. For take-offs, climb and landings the pilot uses "low" gear, and for cruising he shifts to "high," just as in an automobile. On the face of it this seems like a step backward to the days of the geared airplane engine before they had variable pitch propellers. But no, this actually is something new, a reversal of the original need for geared engines in that it can be geared *down* to obtain maximum propeller efficiency. The economy gained by this simple device has put the X-7 at the top of the list on the basis of fuel consumption per hour, per mile, per horsepower.

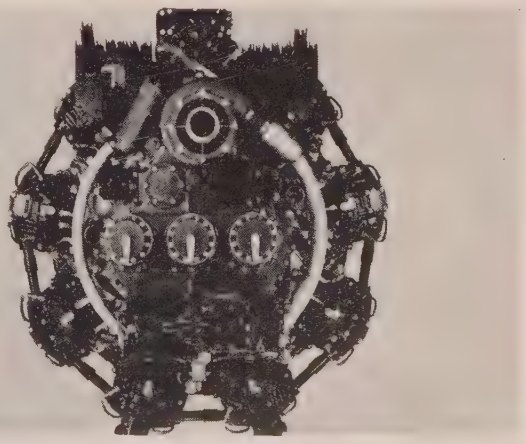
Colonel Wassell wasn't looking the other way, either, when he made a deliberate comparison of the big Lycoming engine with the gas turbine propeller (turboprop) for long-range operation. Wright Field's Power Plant Lab has been right at the heart of turbojet and turboprop developments for the past six or eight years, and those boys know the score. Wassell was a side-kick of Colonel Don Keirn, jet propulsion project officer, liaison with the British on all their developments and winner of the Thurman Bane award in 1944 for outstanding contribution to aeronautical development. Wassell is all for turbine developments, but holds that certainly for the present, and maybe for decades to come in the aircraft propulsion spectrum there is room at the *very* long-range end of the scale for the big reciprocating engine. And that's that.

We'd like to tell you the exact fuel consumption during cruising, but AAF says no, or at least not yet. Maybe we won't get sent to Siberia if we mention that the gallons per hour ratio for cruising is just a bit less than *one-eighth* the amount required for take-off, an unheard of ratio. Another ratio on the highly favorable side is that of horsepower per cylinder, or 139 hp for each of the 36 cylinders. This used to be about 100 hp per cylinder, but during the war it was increased to 125, 133 or more. Thus Allison's 12 cylinders were turning up 1,525 hp for take-off, the *Merlin's* 12 about 1,600, Wright *Cyclone's* 9 cylinders about 1,200, P & W *Double Wasp's* 18 cylinders about 2,400 with the newly developed water injection. All this on 115/130 octane fuel. Refinements since then, plus the use of 130/145 octane has boosted this ratio, so that with water injection 150-hp/cylinder has been equaled or exceeded, as in the Rolls-Royce *Griffon's* 2,000 hp with 12 cylinders, Wright R-3350's 2,700 hp with 18 cylinders, etc. This means that

(*Continued on page 92*)



SIDE VIEW of the X-7, which like an automobile has gears, i.e., low for take-off and climb, high for cruising



REAR VIEW of Lycoming's big engine, built especially for very long range operation. AAF will flight test it soon

Fly For Free

(*Continued from page 19*)

License. A well-rounded combination ground and flight course offered at some of the larger schools is the Base Operator's Maintenance Course under which you get both the A & E License and the Private Pilot's Certificate.

All of these courses obviously have a definite vocational value, but if you just want to learn to fly as such, that's OK by Uncle Sam, as long as you go on through to your Private Pilot Certificate. In addition to this, however, they are good for college credits as well, *if related to other courses.* Present regulations do not permit two or more unrelated courses at the same time, such as electronics, commercial chemistry, etc., plus flight training. Examples of flying as "related" to other courses would be the highly promising aeronautical engineering course, or in wholly different fields, a major in salesmanship where there was definite expectation of using a personal plane to cover a territory, or a law student expecting to specialize in aviation law. Interpretation in such cases may depend on the particular college.

If flight training is not definitely related to the course selected it will have to be taken separately. This does not mean that students taking general courses, law, engineering, salesmanship, etc., can take their flying during summer vacation. They must first complete their regular course. Therefore if it's just a question of the Private Pilot Certificate, which can be obtained in 10 to 15 weeks at a cost of $500 or so (which uses up government payments for one year) it might as well be taken before the general college course is started, and then you'll have it, even if you have to forfeit some of your future eligibility. After all, if you can complete two or three years of college under the Bill you will be able to scrape up ways and means of finishing the course and getting your degree.

To get flight training here's all you have to do. (1) Make application for certificate of entitlement at your nearest Veterans' Administration Center, by filling in Form 1950. (2) Take with you a photostatic copy of your discharge. (3) The entitlement will be mailed to your home address within a few weeks. (4) Find out from the flight training adviser or supervisor at the VA Center what schools and/or colleges in your area have VA contracts to give flying and the related ground instruction under the GI Bill of Rights. (5) Make application for enrollment in the course that fits your particular need. (6) Bring your entitlement with you to the school. The total tuition in all aviation flight and ground courses is paid by the Veterans Administration, with subsistence of $90 per month if married, $65 if single.

In some areas a college or university which has well organized aeronautical courses will give the ground portion of the instruction for the various courses, with the flight and/or mechanical parts of the courses given at a dozen or more flying schools in the area. A good example of this is the set-up at the School of Education, New York University, which offers six different ground courses of 30 to 50 hours each, evenings. Each course counts two points toward a college degree. The flight instruction is given at 14 different flying schools in the New York metropolitan area, including the airports located on Staten Island, Long Island, Westchester County and New Jersey. On the other hand, some of the larger schools in other parts of the country give the whole works themselves.

Professor Spaulding, in charge of the wor at NYU, reports that from July 1 to Decen ber 1, 1946, more than 300 GI's took one more of the courses offered and were give their certificates; some 200 more are en rolled for the courses at the present tim Most of these have jobs, come for the ground school courses at night, and tak their flying time after working hours durin Daylight Saving (up to the end of Septembe and after May 1), and Uncle Sam is footin the bills.

Here are some of the ground course offered at NYU, and an indication of th particular needs they are fulfilling.

Private Pilot's Course in Aviation. 50 hour Includes meteorology, air navigation, civ air regulations, general service of aircra and radio. Tuition, $35.00, including unive sity and lab fees. This course is taken b many who have wanted to learn to fly bu have never had the opportunity. Also by number of A & E mechanics who feel tha ability to fly and the possession of a Privat Pilot's Certificate will be of great value t them in their future work.

Flight Instructors' Course. 40 hours. In cludes ground instruction in fundamentals o flight instruction and in the analysis of fligh maneuvers. Tuition $30.00, including unive sity fee. This course is very popular wit large numbers of pilots who flew fighter bombers or transports during the war an wish to obtain a Flight Instructor Rating

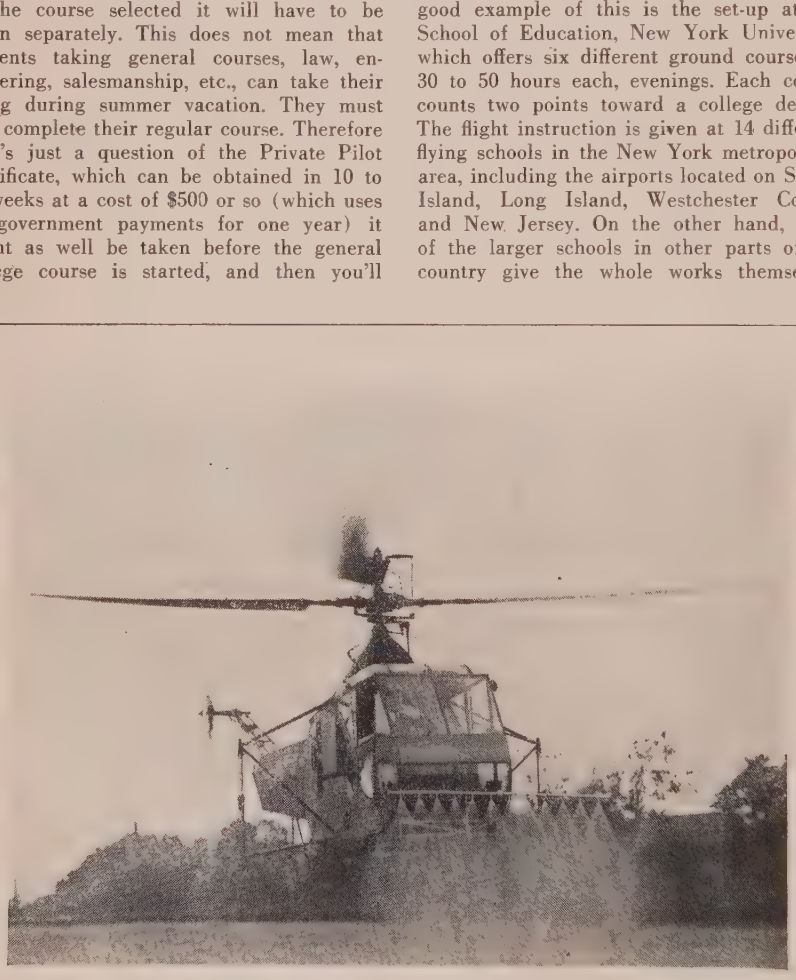
The other four courses have special im portance for commercial pilots and includ the *Commercial Pilots' Course, Aviation and II,* 30 hours, $30.00 each; *Instrume Flight Ground Course* and *Celestial Navig tion Course,* 30 hours, $30.00 each. The latte is of special interest to those who wish t teach navigation, including the latest radi aids, as well as pilots wishing to prepare fo international air transport work.

These courses include four of the fiv Unit Flight Courses as required by the G Bill of Rights per VA Circular 119, May 1 1946. These are (a) Elementary Flight o Private Pilot Course. (b) Advanced Fligh or Commercial Pilot Course. (c) Flight In structor Course. (d) Instrument Ratin Course. The fifth course, (e) Multi-Engin Class Rating Course, which qualifies you fo twin-engine rating, is purely a dual fligh training course, and as such is not given i the ground school course at NYU.

Typical of the New York metropolita area flying schools where GI flight instru tion is given, with ground school course a NYU, is the Zahn-Hoffman-Looney Flyin Service, Amityville, Long Island, run by veteran of World War I, an Army air ve eran and Navy air veteran of World War I Rates vary as the GI is billed for actua flying time only, but the following are fai averages, based on minimum and maximu requirements for the various courses. Privat Pilot's course (18 hours dual, 22 hours solo) $400; Commercial Pilot's course, (35 hou dual, 95 hours solo, in addition to 35/4 hours for Private Pilot ticket, total, 16 hours or more), $1,600; Flight Instructor course (32 hours dual, 10 hours solo), $45

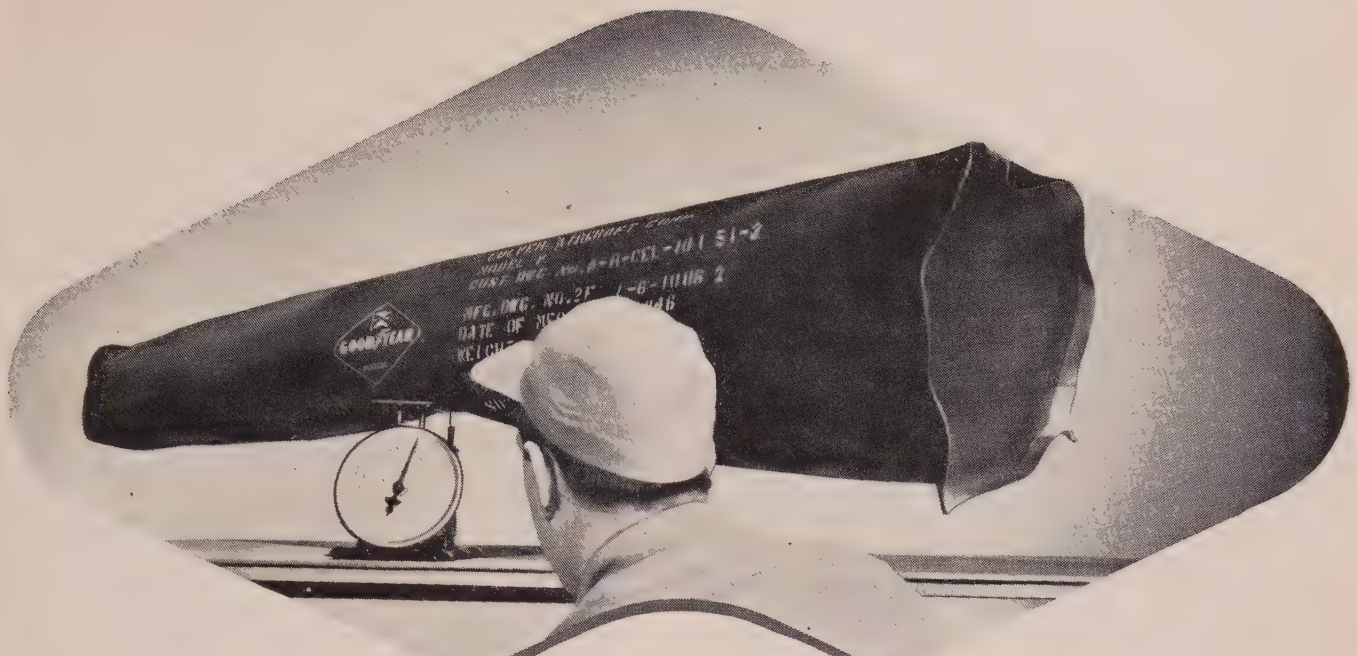
An idea of the complete course, groun and flight, can be obtained from the follow ing outline of the courses offered at a wel known school in the mid-west, (Brayto Flying Service, Lambert Field, St. Louis approved by the VA, the CAA and the Stat

(*Continued on page 93*)



Britain's New Crop Duster

Used exclusively for agricultural work, the *Hoverfly*, called the Spraying Mantis, is capable of carrying three to four tons of insecticide from field to field, 50 gallons per acre. A demonstration was recently given by Pest Control, Ltd.



PLIOCELS
hold more gas - weigh less!

On many of the newest personal planes today, Pliocel fuel cells have been made standard equipment to provide maximum gas capacity with minimum weight. Developed by Goodyear Research, Pliocels are made of specially treated, gas-tight, nylon fabric and weigh only .075 pound per square foot. They are leakproof, having no metal seams or riveted joints to work open, and long outlast heavier metal tanks. In abrasion tests they have withstood amazing punishment without damage, and are approved by C.A.A., Army and Navy. The Airacobra winner of the Thompson Trophy race, the "Truculent Turtle" and the "Dreamboat," all of current fame, used Pliocels for weight-saving and increased fuel capacity. Designable in all sizes and shapes, Pliocels can be installed in locations heretofore impossible, increasing gas load. Specify Pliocels on your new ship. For further information ask your aircraft dealer, or write Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

GOODYEAR
AVIATION
PRODUCTS

MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

Pliocel—T.M. The Goodyear Tire & Rubber Company

Bandleader

(*Continued from page 21*)

time, and he takes over the piloting business when I'm tired, or if bad weather forces me to travel with the band by bus, he follows later in the plane.

The average band does almost all of its traveling by night. They finish a job at, say 2 a.m. As soon as the equipment is packed, the musicians pile into the band bus and travel on to the next town, getting there anywhere from 7 or 8 in the morning to 1 or 2 in the afternoon, depending on the distance. Night travel has been found better in case of an accident. As simple a thing as a flat tire could make a band late for a job if enough time had not been allotted.

A life like that isn't easy on musicians, and its doubly hard on the bandleader, who must make personal appearances at record stores, be interviewed on radio programs, receive the press, and do a myriad of other things besides actually appearing on the job. In the years B.C. (before Cantina), I was a member of the walking dead. It was a rare night when I could enjoy 6 hours of uninterrupted sleep. But since the "Cantinas" came along, bless them, my schedule has been completely rearranged. Here's how it goes.

As soon as we reach a town, my pilot, Frank Campbell, checks with the airport on the following day's weather. He then checks train and bus schedules to the next town where the band will play. He continues to check the weather constantly until we have finished our night's work. As the bus is being packed, he reports to me. If the weather is clear, I tuck the musicians in, see that everything is under control, and then head for the local hotel and a good night's sleep.

The following morning Campbell is busy on the phone again in case of the slightest change in weather. If the weather looks threatening, he wakes me in plenty of time to catch a bus or train to the next town. If the weather is good, he lets me sleep until 10 or 11 and then we get up, eat a leisurely breakfast, go out to the airport, and fly "Cantina" to the next town, ready to get back on the job again. Where it may have taken the slow-moving bus 6 hours to make the trip, we can usually make it in about an hour and a half. And I've had a chance to get a good night's sleep, and still not lose any time. Besides, for 90 whole minutes I can forget all about stick waving, singing and trombone playing. I get some good air in my lungs and enjoy a nice ride, high above the head of the most avid autograph fan!

Why do I fly? It's time saving and it's relaxing. Period!

I've noticed a lot of things about this town-to-town hopping. For one thing, you can get into almost any town by plane. There are a lot of available landing fields and while more are needed, it is still possible to fly to almost any town of any size at all and be sure of having landing space available within a short distance.

Many small towns should take more time to develop their airfields, though, and should take more pride in making things easy for their air visitors. Not too many small fields are radio equipped, so daytime travel is advisable. And the field operators in small towns all seem to feel that their efforts are rewarded. They tell me that a lot more small towns could support fields if they only would realize it. I concur with that theory.

One thing which is more needed than almost anything else is better transportation from fields to town. Usually you have to spend more money taking a cab into town and back than your entire trip by air has cost. The loss of time in transportation to and from fields is also lamentable. Why take a plane if you can't save time on the trip?

I also believe that many more fields could support restaurants and sleeping accommodations. Motor court people, for instance, might build on highways with a consideration of their proximity to an airfield. They needn't rely wholly on plane passengers, but they would be well rewarded, I believe, if they at least considered this as an added means of revenue. That Skytel idea that SKYWAYS has promoted for the past few years is a sure-fire thought. Businessmen would do well by investors if they'd consider it.

There's a field, it was Mansfield, Ohio, where there is a large restaurant, literally jammed with customers, both from the field and from town. And I have seen rooming houses and auto courts reap a harvest from airfield trade, too.

In many instances a small town will have a beautiful airfield and then will not follow it up with good plane service or with even good gasoline service. This also seems to me to be a major shortcoming.

I speak of these things merely as observations from my own business travels. They may help some people to better understand the flying 'businessman'.

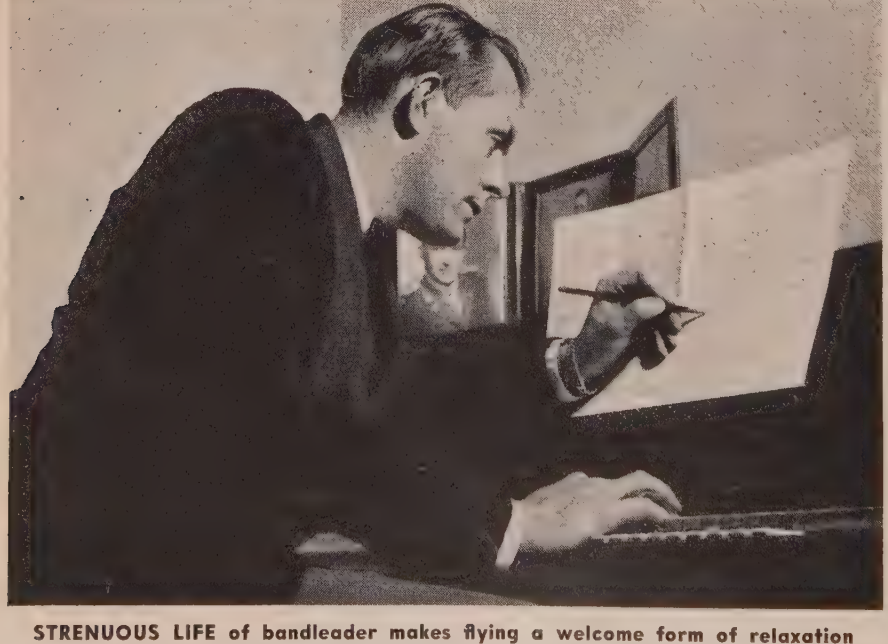
In traveling from town to town, like we do, you must consider your ship's characteristics. It is advisable to have a plane with slow landing and quick take-off characteristics since some fields have extremely short runways. It would be utterly impossible to fly a whole band from town to town because of that very factor. A plane large enough to fly the whole orchestra could never land on and take off from today's small town fields. But it'll be a great day when I can ferry the boys by plane, too. For a bandleader who may have a certain amount of night flying to do, two way radio and lights are 'musts'.

I've had a lot of rest, a lot of fun, and I've seen a lot of beautiful sights since I took to the air, and I intend to keep it up. On my last one-nighter tour I was forced to take the bus only once because of bad weather. That's a pretty good average.

In fact, I like flying so much and find it so convenient that I'm putting a landing strip behind my Boston-suburb restaurant, The Meadows, in Framingham, Massachusetts, so that I can commute to my apartment in New York or to my summer cottage on Cape Cod while the band is playing at the Club. I did it last summer and it was wonderful . . . spent my days on the beach and flew in every night to go to work.

Just to round out the convenience angle I'm now adding a seaplane rating to my ticket. Seaplane flying has an attraction all its own as far as pleasure is concerned. And living near the water—who knows how practical I may find it in the future?

Now that's living! But a bandleader ordinarily just can't do it. I'm glad I'm getting the air . . . at last!



STRENUOUS LIFE of bandleader makes flying a welcome form of relaxation and an excellent medium of travel as it allows extra time for sleeping

Vaughn Monroe is not only the "flying bandleader," but he is also one of the most popular bandleaders in the nation today according to popularity polls by the leading trade papers in the music field. His band has just completed filming their part in "Carnegie Hall," is featured on its own CBS radio program every Saturday night, is responsible for the sales of hundreds of thousands of phonograph records weekly across the nation, and has broken more box office records during the past year than probably any other band in the country. The maestro may be up in the air, but his feet seem to be firmly on the ground!

And, one word of warning . . . don't ever bet between Monroe and a bobby soxer. They go for him like they do for Sinatra . . . almost turned his taxi over in Boston recently in an effort to reach him. Maybe that's why he flies. To get out of reach!—Ed.

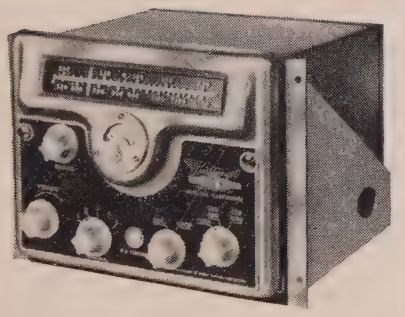
Flightweight

BENDIX RADIO

V.H.F. "ALL WEATHER" TRANSMISSION

airline performance for your personal plane!

BENDIX RADIO FLIGHTPHONE PATR-10



Complete, 2-way radio package which combines in one unit: 1. V.H.F. 5-channel transmitter with range up to 75 miles, requiring only a 24″ rod antenna. 2. Medium frequency range and broadcast receiver with connection for direction finder loop. 3. Internal power supply for receiver and transmitter. Dimensions of unit behind panel: Depth 6¾″; width 6⅝″; Height 5⅛″. Weighs only 8 pounds complete, with shockmount.

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Bendix FLIGHTWEIGHT* radio equipment has been especially designed for light-plane use—it is compact in size, light in weight, economical to buy and use and styled for the smartest plane.

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Decca To The Rescue

(*Continued from page 22*)

radio signals constant in phase along hyperbolic lines from a "chain" of ground stations. (American Loran and British Gee are also based on hyperbolic principles, but otherwise bear little resemblance to Decca.) A Decca chain consists of a Master station and three Slave stations, known as Red, Green and Purple slaves. Working in pairs, 360° coverage is obtained—Red and Green covering 120°, Green and Purple, 120°, and Purple and Red, 120°. The transmitted radio signal from the Master is received by the Slaves, where it is changed in frequency by each one; at any point in the area covered the Decca Navigator receiver in the airplane picks up the signals from the Master and two of the Slaves. On specially prepared Decca charts the hyperbolae are divided into lettered zones, A, B, C, D, etc., which show in the meter faces on the Decca receiver (see photo under map, page 23). The lanes in each zone are distinctively numbered in the Red, Green and Purple patterns. Reading off the letter and number from the two meters and plotting them on the Decca chart takes but a few seconds; where the two lines intersect is where you are.

This general use of the Decca Navigational system in free flight is uncannily accurate and provides a very useful flexibility and plenty of leeway in the lateral dispersion of aircraft. However, it falls short of meeting the critical problem of heavy traffic over a major air terminal with planes coming in every minute or two in bad weather. Decca's solution to that problem involves the use of an additional gadget, the 30-pound Track Control Unit. In point to point flight each aircraft is assigned to one of any number of definite tracks. A film record with marks carrying the values of the various hyperbolic fixes of the entire flight is inserted in the Track Control Unit. During the flight this unit, by reference to the Decca Navigator receiver, constantly checks the position of the aircraft and compares this position with the position required to make good the intended track. Continuously, accurately and automatically it presents the result of these checks to the pilot by means of a simple display panel (see photo, page 22). With as little effort as it takes to watch a taximeter tick off the bad news mile after mile, the pilot can see (1) his displacement to left or right of the track up to one mile, by indications of each 200 yards, (2) miles to destination, (3) his ground speed, and (4) the number of minutes the airplane is behind or ahead of time schedule at all points on the route. All he has to do is keep the needle on zero in the Displacement dial. No training is required; less than 10 minutes' explanation suffices.

The tracks leading into LaGuardia Field from, say, Chicago or Washington would all avoid such obstacles as the Empire State Building by a safe margin. Tracks can be of any shape and can include detours to avoid mountain peaks or other hazards; altitude can be changed to avoid bad weather.

A few minutes before arrival at the fringe of the Approach Control Zone of the destination airport, the pilot reports and Approach Control allocates by reference number whichever of the standard Approach Tracks it is desired the airplane should use. The magic roll of film, in addition to the point-to-point fixes on the track, carries a series of marks which apply to all the various planned Approach Tracks. The pilot merely has to turn the switch on his panel marked "Approach Selector," to the number given and continue to steer by meter, as before, simply keeping his needle centered on the main dial. The airplane will then automatically he brought along the required Approach Track into position for instrument or visual landing.

Should he be required to circle around, or orbit, on account of bad weather, temporary congestion of traffic, etc., Approach Control will allocate an Orbit by reference number, and by switching to the number given on the "Orbit Selector" the pilot is automatically kept on his orbit course by keeping his needle centered on zero. As soon as conditions are suitable he will be called in along an Approach Track leading out of his particular Orbit to the runways.

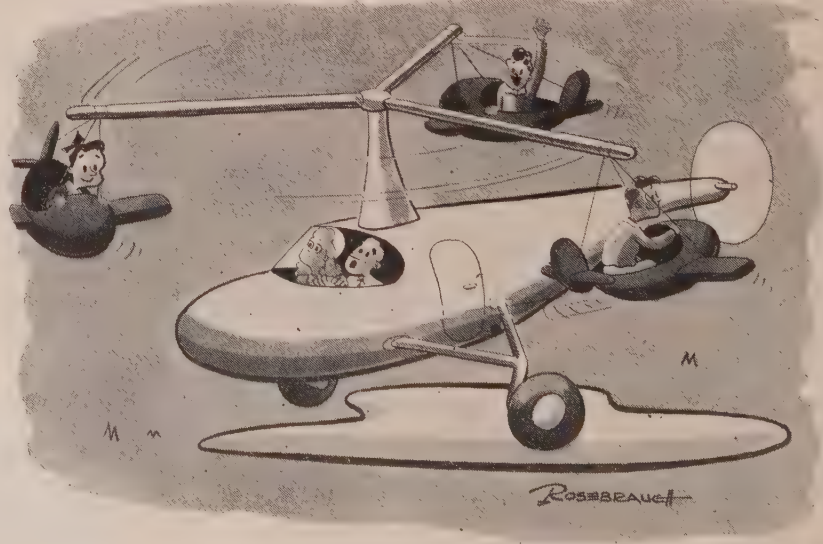
This procedure is simplicity itself, and takes away the strain usually thrown on the pilot under the present system of stacking airplanes one above the other on different levels. As far as the passengers are concerned they may not be too impressed by the fact that they are in an "orbit" and not in a "stack," but under the Decca system with as many tracks as desired and automatic guidance to the runway, airplanes can be landed more rapidly, there is less likelihood of having to use the Orbits than under the present single radio-beam system, and even when used it will be for a shorter period.

The Decca Navigational Aid System was conceived by a young American engineer, William J. O'Brien, and was developed during the war by O'Brien and H. F. Schwarz of the English Decca Company, in conjunction with the British Admiralty. Dudley H. Toller-Bond, formerly Senior Scientific Officer in the British Admiralty and now Decca's chief engineer, was in charge of the practical trials and demonstrations. At the present time a chain of transmitting stations, owned by the Decca company is now operating continuously in England, night and day, for the navigation of airplanes and ships of any nationality, whether privately or commercially owned. Its accuracy varies from 30 feet at distances up to 50 miles down to 300 yards at a distance of 600 miles in daylight. This daylight limit of 600 miles is reduced to 300 miles during the hours of darkness due to the presence of sky wave.

Toller-Bond is now in this country as chief engineer of Decca Navigator System Inc., a newly organized American subsidiary of the British company. An application is being made to the FCC for spot frequencies in the 80 to 140 kc (low frequency) band to set up a Decca chain in the highly critical New York metropolitan area. A tentative survey is being carried out under the direction of Toller-Bond (already referred to as "T-B" by his associates, according to good old English custom), who has given *Skyways* the program as it shapes up at the present time. The Master station is planned to be near Mahopac (NY), with the Red Slave in Long Island's Brookhaven district near Mastic, the Purple Slave in the vicinity of Copake (NY), and the Green Slave near Andover, Sussex County (NJ). This will afford maximum usage of the system for ships along the coast and for aircraft coming into the New York area on a 300-mile radius by night and 600-mile radius by day (see map for the wide coverage thus made available). Based on British experience, the boon to shipping in the approaches to the complicated and frequently fog-ridden New York harbor is expected to be tremendous. As in England, the American Decca Navigation outfit is a private company, will make the ground installations at its own expense and lease the equipment to be used by airplanes and ships. Because both will use it, cost will be definitely reduced. Installation is expected to take five or six months after FCC approval is obtained.

Nobody says that Decca or any other system is the final answer to the highly critical and complex problem of automatic flight, air traffic control and bad weather landings, but experts who have seen it work in Great Britain and have studied its application in the United States agree that the Track Control Unit, used with the Decca Navigational Aid System, is a darned good answer, and the sooner it gets in there pitching the better.

SKYWAYS

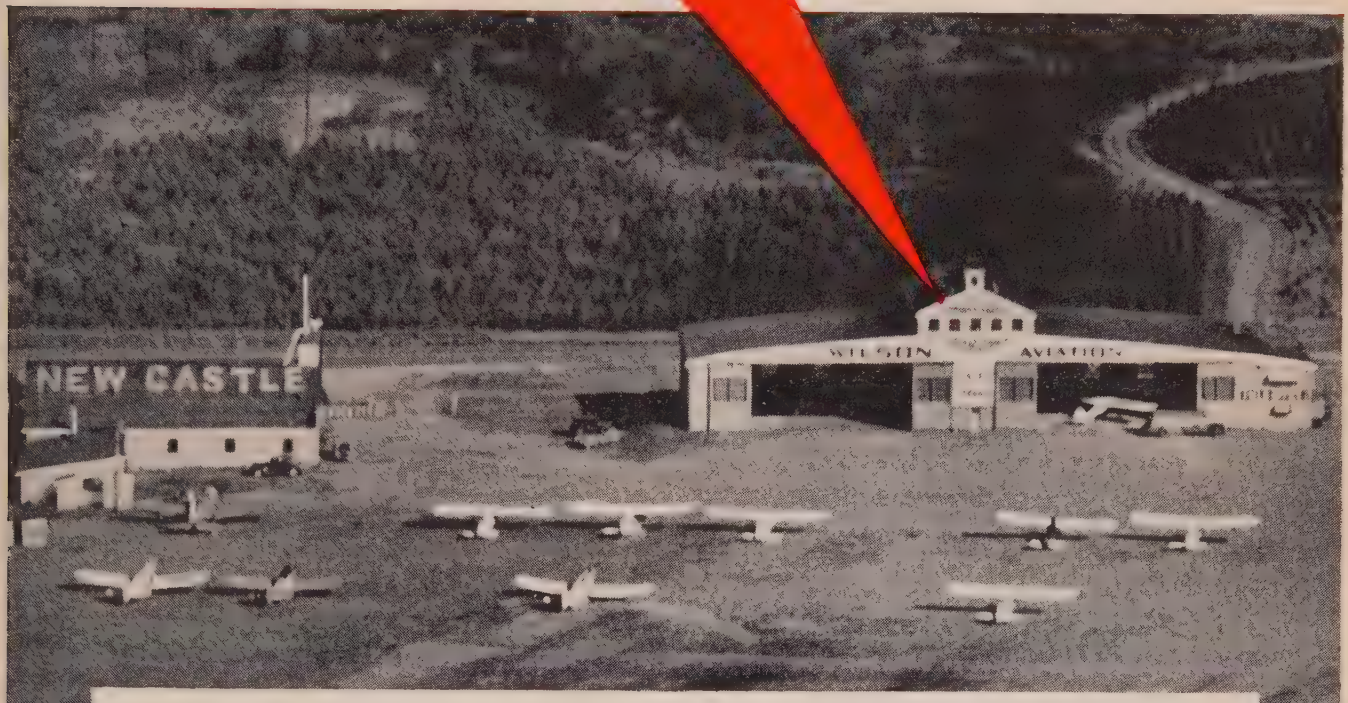


ROSEBRAUGH

"If you ask me—I think we're spoiling these kids."

"Esso is in step with the times"

Says Findley Wilson
New Castle Airport, New Castle, Pa.



MR. FINDLEY WILSON, owner of three airports in Pa., has been a part of aviation's growth since 1919. He has taught flying for the past sixteen years, and during 1943-1944 he and his wife trained over 3000 Army and Navy pilots. They are operating two schools at present.

Regarding equipment recently installed by Esso Marketers at his New Castle Airport, Mr. Wilson writes: "Esso's policy was, 'We will pioneer the field with you.' Later, when we started another new airport, Esso was right on the job. We feel this Esso policy is right. Esso is in step with the times!"

Yes, Esso's willingness to serve Aviation Dealers like Mr. Wilson and cooperate with them wins new friends for the Esso Wings continually. High-quality, dependable Esso Aviation Products backed by over 40 years' aviation experience, dating from Wright Brothers' first flight at Kitty Hawk, have earned the respect of dealers and flyers alike!

YOU CAN DEPEND ON

Cessna

(*Continued from page 26*)

stance. Advertisements state you can drop the 140 (or 120) in without damaging the gear or the plane—well, you can. I did, on a gusty day at an airport in New York State—Stormville—in up-and-down drafts, one going up lifted Cessna NC 76310 to a height of at least 10 feet at stalling speed and stalling altitude. When the gust subsided, I purposely 'lowed the plane to touch down without first giving it a boost of power to flare out for a hard landing. Normally you'd end up with at least a good imprint of the cushion on which you're seated, but the landing was like a normal drop in from a couple of feet. (Record drop of 15 feet is claimed by a pilot in the Southwest. While your SKYWAYS reporter doesn't hold this record, the 10 foot "short" drop in for a landing is mentioned to bring out the fact that the Cessna molybdenum steel landing gear *is* a revolutionary "new" in 1946 aviation annals.)

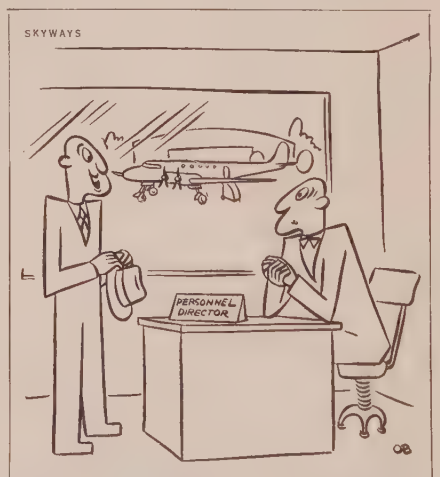
And another thing—ads and descriptive literature about many a plane emphasize the swiveling tail wheel as an aid to taxiing and parking. Let me tell you this isn't always the case, but in the instance of the Cessna 140 it is! Rudder pressure will give the pilot an immediate change in direction, with no right or left brake necessary. The right and left toe brakes, either individually or together, hold without grabbing or slipping. But to elaborate on the tail wheel's quick response: some of you wary pilots may come up with the supposition that since the tail wheel is readily steerable from the rudder pedals, misuse is all too probable, and this would necessarily contribute to ground loops. In some 12 consecutive landings in two days, at a different airport each time, in gusts and crosswind conditions, the writer discovered the 140 did not show any tendency to ground loop. The plane demonstrated good directional stability, and the use of rudder commanded a performance comparable to a tricycle gear ship where the center of gravity (CG) is forward of the undercarriage. The CG on the Cessna being rearward of the gear, the good landing traits are directly attributable to the fact that there is so much give (or spring) and spread in the landing gear that it tends to "even out" landing pressures.

So the gear, besides being a type that will require no maintenance, has the added charm to the Cessna owner of warding off the wingtip damage and nose-ups prevalent in an uncouth ground-looping plane. To the pilot all this insures care-free landings and quick ground maneuvering, minus fuss and fuming.

Here and there an onlooker would ask "Does the spring in the gear affect the landings?" which is another way of asking whether or not the plane "gazelles" down the runway in the manner of a kangaroo. The answer definitely is, "No." If flying speed is gone when the wheels touch for a landing, the Cessna stays down. And if it comes down hard, the landing is cushioned. If the Cessna contacts the surface before flying speed is gone, up you go, but not until the gear spreads and absorbs some of the shock an aircraft normally has to endure when a conventional fixed-type gear is the undercarriage.

In an effort to get a really fresh viewpoint on cabin appointments, etc., your reporter invited a bystander, who had never been in a personal plane before, to climb in and look the cabin over. She experienced some consternation trying to figure out how to get into the ship. All of which goes to show that entrance to the Cessna—as in so many of today's personal planes—presents a few difficulties to those unfamiliar with airplanes. Hand grips, conveniently located on the instrument panel deck, plus a step half way up the landing gear leg made the cabin entry procedure through either door simple and most acceptable for my part. But I've been in and out of planes one long time and perhaps my know-how is a direct accumulation of "strugglings" to get in and out of different planes. Personal-plane-builders would do well to try out their cabin designs on "unfamiliar" people. The builder might get a better reaction—and subsequently produce planes with less sales resistance from a passenger's point of view.

How about the looks of the interior? My testing knell, the women who had not climbed aboard a personal plane before, admired the interior but was not surprised. Said she, "For the price of a Cadillac it should be nice." A bit of a realist, her! But we're happy to report, that it *is* a well appointed interior, pleasing to the eye—a very durable sport-tweed material, fire-resistant too, with leather trim, covers the two seat cushions and the seat back. And it does have the look of a Cadillac about it. The pilot can adjust his seat relative to the rudder pedals, and give it a tilt if desired. For placing the 80-pounds allowable luggage in the baggage space, it is necessary to lift out the seat back (like most aircraft equipment this is extremely light in weight). The method is perfectly acceptable for stowing luggage—more favorable in fact than walking around to the rear of an automobile and lifting a heavy compartment door. The Cessna's metal luggage compartment will store your best "cowhides" without maiming them.



"I've had 400 hours air experience—checking tires in a filling station!"

The door is closed by an automobile-type handle (inside), though much lighter in composition than a car's inasmuch as weight is an important item in planes. On the pilot's side an acetate window opens out on a metal hinge to provide ventilation while taxiing. A pair of snap vents, one on each side of the one-piece curved plexiglas windshield, let in air during flight. The color of trim on the instrument panel is an easy-on-the-eyes gray. The two-wheel control column, projecting from the instrument panel, moves forward and rearward. The wheels are half-moon shape, one spoke in each. When the spoke is perpendicular to the floor the wings are level, or ailerons in neutral position. Worth taking note of prior to take-off. Pilots new to wheel-type controls have been known to pour on the coal for take-off with full right or left aileron. So take note "new pilots"—spoke straight up and down—ailerons neutral.

The Cessna's cabin is roomy and two passengers, seated, do not rub shoulders. Welsch maintains he wouldn't hire a salesman—no matter how personable a chap he was—if his size made the cabin of his ship appear small to the customer. Yet one of his representatives who is going about these days in a Cessna 140, is a man 6 feet tall, weighing 230 pounds. Nuff said.

Radio installation in the left glove compartment space is arranged for a GE *Radiophone*. Mike plug-in and a hook for the the mike are on the right door frame. There are two headphone plugs—one on the left side, the other cached near the ceiling but in back of the right-seated pilot. The cabin floor had a raised section (covering control cables and gear bracing) that was a convenient receptacle on our two-day flight for navigational items and a box of assorted refreshments. The metal cover over the baggage compartment provided us a neat catch-all for ditching camera, extra sweaters, portable typewriter, etc. The cabin in the Cessna 140 is a comfortable place, indeed. Perhaps it was after noting the functional lay-out of this cabin that the designers delved into the long fuel range which the Cessna has, believing the cabin's appeal would easily entice strangers to try and sit it out. How right they were!

The Cessna's visibility from the cockpit is acceptable. For taxiing it could be better but, as pointed out before, the Cessna's pilots are not going to be new to flying by the time they get to gadding about in a 140—and ground viz was 100 per cent after using rudder to swing the nose.

Take-off in the Cessna is not particularly astounding in performance but neither is it demanding of extra-curricular activity in the cockpit. Once trimmed for take-off; throttle full forward, engine developing 2,585 rpm, the pilot can hurry the take-off and improve take-off visibility by inching the stick slightly forward. Right rudder pressure is required, sparingly at that. Climbs after take-offs were very good.

The Cessna chalks off an easy 105 mph at 2,300 rpm with two aboard, maximum fuel load and full baggage allowance. With very little "cargo" we cruised at 110 mph. When only one is in the Cessna and carrying a spare amount of baggage, the plane clips along at 115 mph at 2,300 rpm. Maximum cruising rpm is 2,500.

The fuel consumption rate is a scant 5 gph or, slightly leaned is a mere 4.5 gph (gallons per hour). That's on a new engine. The fuel capacity per tank is 12.5 gallons, so the fuel range is 2 hours 45 minutes, each tank—or 4 hours 45 minutes total flying time, leaving a specified 45-minute fuel reserve required on a Flight Plan filed with Airways Control. In 4 hours 45 minutes in

(*Continued on page 70*)

My Float Base Cost only $116

"From June to September, Lake Tahoe is one of the most popular of all California resorts. Flying floatplanes, from a base that cost only $116, enables me to cash in on the rush season up here each summer. The gross is good, without tying up money in real estate or airport maintenance. And float flying has made my base the social center of the lake."

—Part of a letter from Wes Stetson, Emerald Bay Resort, Lake Tahoe, Cal.

RESORT BASES ARE BONANZAS

Wes Stetson operates the highest float base in America—6,275 feet above sea level. He moves in and out with the seasons, with all airport construction and maintenance handled by Nature. And floats put him right in the center of a crowd ready for fun and flying.

Any resort on or near water, and with a good annual volume of visitors, is ideal for float operations. Vacationists have leisure, money and a desire for sport. Flying forms a strong attraction for them, more so if from water. And resorts are a natural destination for transient flyers—to add more dollars to an operator's revenue from fuel and service. Resort managements are usually cooperative, for a float base brings in more visitors, gives them more choice for recreation and adds to the modern appearance and prestige of the place.

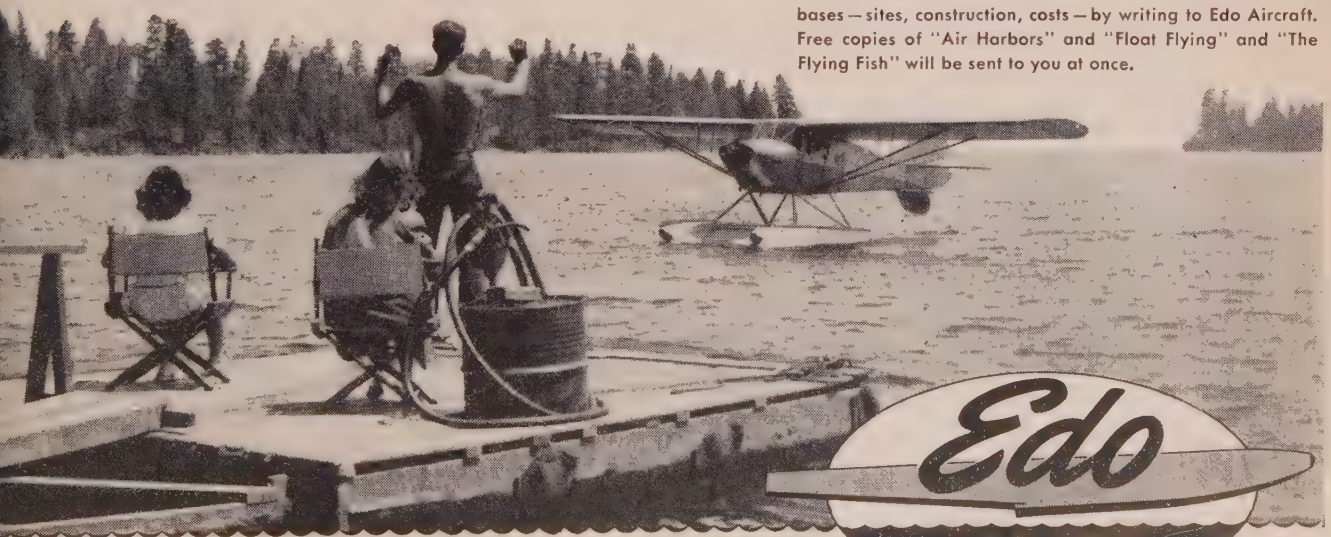
MANY SITES AVAILABLE

Resorts dot the map from Canada to the Gulf. Thousands are good spots for new floatplane bases. And it doesn't take much capital to start. Stetson spent only $116 for a base. A Lake Champlain operator used a strip of beach all season, spending exactly zero for ground facilities. If you want to operate floats seasonally, one or more planes and a few dollars for a base will put you in business. If you pick a year-round site you can start with a modest dock or ramp and build as you go. Your cash comes from such things as flight instruction, sight-seeing, charters, rentals, transients, storage, gas and oil and maintenance. Plus whatever side-lines you want to put in, such as water sports or fishing boats.

↑ Potential customers find Wes Stetson's float planes convenient on this Lake Tahoe beach.

Day in and day out, float planes are the biggest attraction for visitors to this California resort. ↓

HERE'S INFORMATION FOR YOU—You can get details on float bases—sites, construction, costs—by writing to Edo Aircraft. Free copies of "Air Harbors" and "Float Flying" and "The Flying Fish" will be sent to you at once.



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Edo FLOATS
FOR REAL FUN IN FLYING

Cessna

(*Continued from page 68*)

a no-wind condition, the Cessna covers 526 miles—with 45-minutes flying time sitting in the bottom of one of the wing tanks! Or, over 1,000 miles with but one refueling stop. That's good!

The metal wing tanks are mounted in the root section of each wing, with each tank having a separate fuel line to the 85-hp Continental engine. Gas drains on a natural gravity-feed system. The pilot selects right or left fuel tank source by means of a manually operated switch situated between the seat cushions. No warning lights are on the panel to let a fellow know when he's running low on fuel in the tank being used but a float-type gauge in the shape of a round dial is mounted in the bulkhead of the cabin over each door. Either occupant can see the gauges with no difficulty.

Cessna designers have placed the stabilizer trim for nose-up, nose-down or level flight in a most favorable location: about 12 inches beneath the throttle. And what could be more logical? Trim-conscious pilots know that with every change of power setting, a new trimming via the stabilizer is in order. Because of a raised flooring immediately in front of the seat, the trim disc is about knee height even though it is partially inserted in the floor between left and right seats. My advice to Cessna pilots is to "use that trim." There's only one ship this reporter has flown that trims up any better, and that ship is in the 150-hp class and is a four-placer. The Cessna trims up with no oscillating for climbing, gliding and level attitudes and holds that trim. In rough air a beginner—though "soloed"—pilot beside me gave an excellent demonstration of smooth flying in rough air—we'll credit 25 per cent pilot and 75 per cent plane.

Another accessory which the pilot uses in flight is the flap control. On the Cessna it is located between the seat cushions; like the trim, it is accessible to the pilot, whether he's in the right or left seat. When no flaps are being used, the lever is horizontal. To use one of the 140's six flap settings, the lever is pulled upwards manually and allowed to stop in one of the six notches.

This reporter is not fully convinced of the great utility of flaps on the 140—at least not on take-off. I tried a take-off with about 10° of flaps off Arlington Feld (Poughkeepsie) but couldn't see that the take-off run was shorter. Later, taking off from Westchester (Armonk, N. Y.) with full flaps, it was again impossible to detect a shorter take-off run. In each case the fields were unpaved and there was little or no wind. My opinion is a pilot shouldn't expect use of full flaps on the Cessna to take him out of a shorter than usual field because the Cessna's flaps hold the plane back and act as brakes more than lift devices.

Jim Welsch reports that flaps on the Cessna being tested with Edo floats, assist take-offs when smooth surface conditions prevail.

For all landings (strong headwinds excepted) if flaps are used, it takes full degree of 'em to notice their effect. This reporter overshot landings at first because I expected the use of flaps to bring the plane in shorter. Once when overshooting I pointed the nose way short of the airport boundary expecting the full flaps to hold the plane's airspeed at my 60 mph preferred gliding airspeed. But airspeed picked up; at 80 mph it was necessary to forward slip the plane in—something a pilot wouldn't try if his flaps were creating a great deal of extra drag (which produces greater lift at low airspeeds, but not when one is blanked off in a slip). On the 140, flaps do not produce a radical change of flight attitude even at airspeeds of 90 mph—this is commendable inasmuch as there will be some pilots unfamiliar with a ship's different flight characteristics when it is under the influence of full flaps.

What do the flaps perform on the Cessna? Number one, they steepen the glide angle and improve the pilot's realm of vision. *They do have their measure of effectiveness* and even though it is moderate, the pilot who learns the degree of this assistance can make very good use of flaps and increase the degree of safety in his planned flight.

Stalls in the Cessna were of ye new reliables, *i.e.* it stalls (43 mph no flaps; 41 mph with full flaps) without dropping off on a wing; it retains a fair amount of aileron control and, in holding the wheel full back (elevators fully raised), the Cessna seems to pick up an extra 1 mph necessary to keep it suspended in flight. When the 1 mph drops off, the craft stalls again only to pick up 1 mph and repeat the cycle . . . this is the way it seemed in the air and with some rpm turning, it undoubtedly is an accurate report. Stalling the Cessna on for a landing seemed to bear this out as this same ability of the plane to retain flying speed brought out the best in the plane's fairing and the worst in this pilot's spot-landing technique. I too frequently found myself wafting right on across a field as NC 76310 idled at a fast 750 rpm. This was particularly true if I'd neglected to give the throttle an extra snug pull.

Compared to the other refinements in this aircraft, the sound-proofing does need improvement. I've been in noisier ships but too often a noisy cabin is the flaw that breaks the sale . . . for this reason Cessna Aircraft Company is running exhaustive tests on the sound level of the 140 and 120. There'll no doubt be improvement.

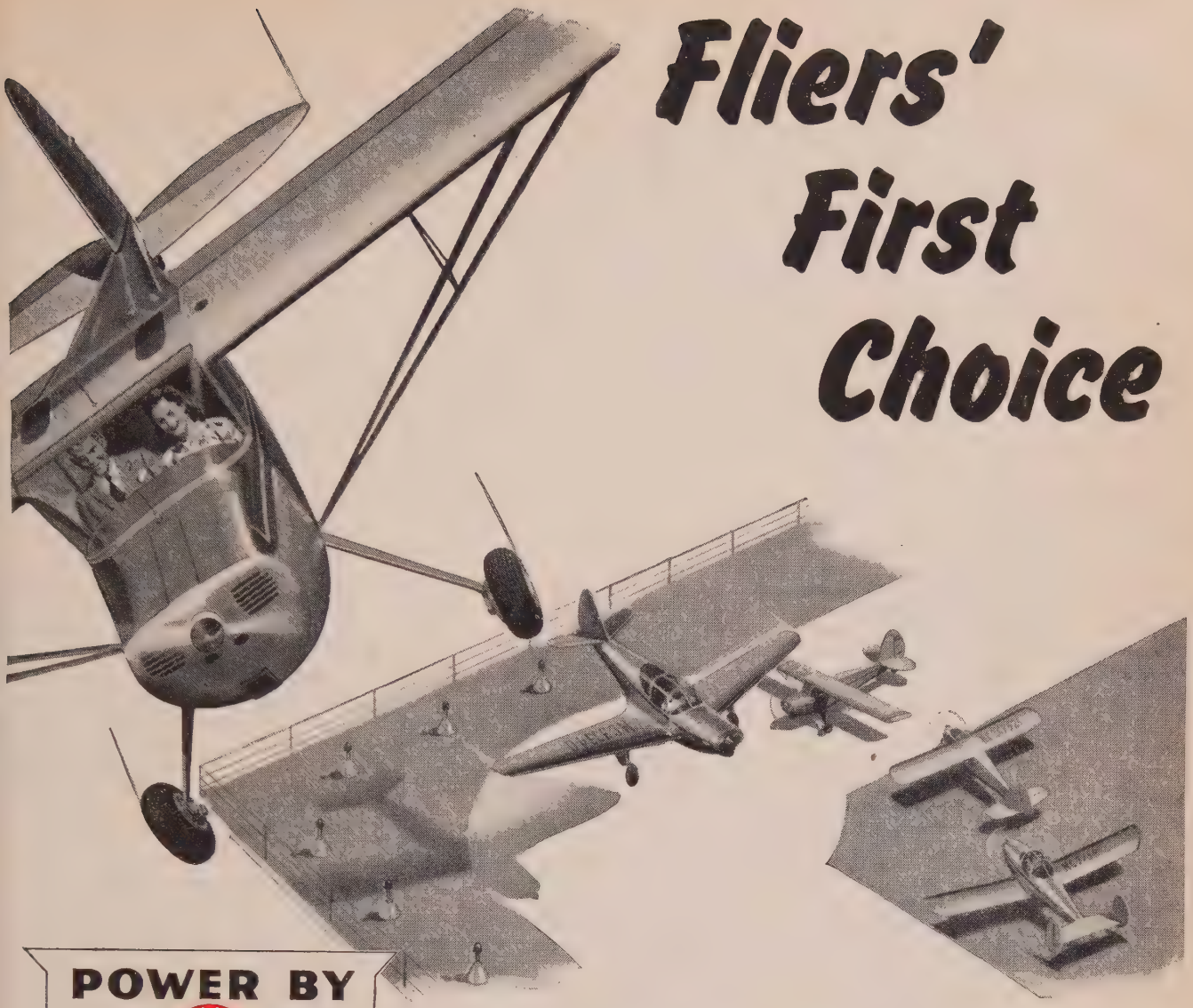
So far, this writer hasn't said anything about how the Cessna "flies." It's not question of evading the subject, it's simp a matter of saving the best for last. T plane has a stability that spells one thin S-A-F-E-T-Y. If the pilot feels confiden in the plane, he has all the confidence needs in himself and in the plane to ma handle the craft as little as possible. lets the plane fly itself, like it's designed do. There are times when this is importa I talked to a Cessna 140 pilot who had, advertently, under a very low ceiling, flo into a thick "cloud" of smoke that chopp his visibility off at his jury struts. stated afterwards that it didn't take mo than 30 seconds to fly through the smo But without instruments to gauge his flig attitude upon the completion of a 180-tu he felt like he was flying blind 5 minut instead of 30 seconds. In any other pla he stated, he wouldn't have had the co dence in the plane to believe it wasn't s raling down (there was no altitude for su a maneuver); he would've tried to "fly" t plane, which is not the thing to do sa instrumentation. But having observed t Cessna in contact conditions he was co dent the plane would fly him through. did, straight and level. This writer wou have the same confidence—and after a flig or two, any pilot would. In the writer's es mation this is about the best recommend tion you can give a personal plane.

The Cessnas sell for $3,245 (140) a $2,695 (120). There are a few extras whi the pilot can add to the 140—radio is e tra; the new McCauley Met'l prop calls an extra $60 but Cessna recommends t prop very highly and it's undoubtedly wo it; brakes on the right rudder pedals a extra; the landing lights themselves are e tra but the wiring is already in the 14 and floats. Edo floats are being licensed the Cessnas with Edo engineers doubt about using the spring steel landing le This will be another story for another tim Equipped with floats, this plane shou prove to be full of the old nick for wa take-off, too—then the Cessna will not o be any pilot's airplane but it will be a operator's ship as well.

Just in case you haven't guessed it, t writer is by now a Cessna fan.

"Well . . . I'll hafta be sayin' goodnight."

Fliers' First Choice



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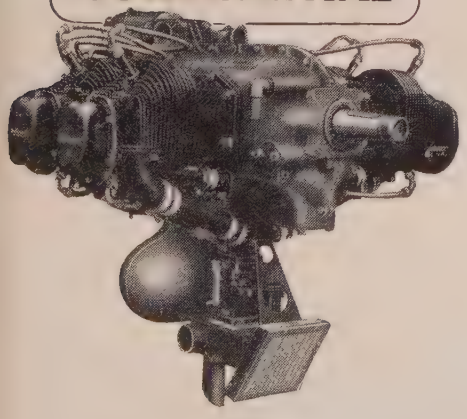

C85. This 4-cylinder 85 h.p. engine is a post war addition to the Continental line. It delivers its full rated horsepower at moderate engine speed, so that maximum propeller efficiency is attained. Low r.p.m. in relation to power is a characteristic of all Continental aircraft engines.

Continental Red Seal Engines *power more personal planes than all other engines combined*

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Continental Motors Corporation
AIRCRAFT ENGINE DIVISION
MUSKEGON, MICHIGAN

Time and Place

(*Continued from page 27*)

minutes along the way). If number one and number two time check points were being passed *before* the end of 20 minutes and 40 minutes, it was then known the craft was making better than 90 mph. But let's get on with our working example.

When you get to Pitman airport (your take-off point) and check the wind and the weather, you discover you have a 5-mile wind from the northwest (this will only add a mile-per-hour to your speed). Now's the time to figure your compass course. It will not be altered by more than one degree by the slight wind while the "8° West" variation noted on the aero chart is added to the course line heading of 233°. Net result is, your heading is 240°—the heading you must hold until the first check point is reached.

To figure a sound Estimated Time of Arrival (ETA) for this trip you would figure four times the 14-minute distances (of 21 miles each) or 56 minutes *plus* 10 minutes for take-off, climb and landing at destination. Your ETA on the ground would be 66 minutes or 1 hour 6 minutes. And if you follow your predetermined compass heading and obey your "time" checks, you'll always hit it.

Let's see how it works—go ahead and take off from Pitman.

Set your timer, if you have one, to 12:00 and start it going. Now it will tell you exactly how far out you are in minutes all the way. Without the timer look at your wrist watch, note the time of day, and write it down. (Even with a timer it's best to mark the time of day on your map margin.) Now you have a choice of two ways to depart for the first check point. You can pick up your course heading after leaving the pattern and head on out or you can circle up over the airport, level off at your cruising altitude and pick up your compass heading while flying right over the airport—this is by far the more accurate way.

In either event you're off. But you don't just sit there until 19 minutes are up without paying any attention to where you're going. Indeed no. You navigate. Look around and see if the towns Pitman and Glassboro are on your left as you leave Pitman airfield. Watch the railroad you will cross at right angles and ascertain whether or not you're crossing the highway first and then the railroad (as you should be). Note the railroad track from Glassboro to Bridgeton and remember to never cross it. Note that as you cross the highway between Woodstown and Elmer there should be a highway between you and Elmer. Not yet do you look at your wrist watch *unless* you have a feeling of uneasiness and start talking to yourself something like this: "Hmm . . . Wonder if I sat here day dreaming and missed the highway between Woodstown and Elmer or maybe there's a strong tail wind I didn't know about—this highway with the towns on my right and left could be Quinton and Bridgeton—maybe the farmhouse is Shiloh, etc. etc. etc.". If that's what you're thinking, go ahead and look on your map for your first time check—it happens to be on the highway between Quinton and Shiloh, and Bridgeton. You're not due there until 19 minutes after take-off time. Looking at your time piece you find you've been out only 11 minutes and with this added assurance you look more thoroughly and see a railroad track going into Elmer from the north and another leaving Elmer and other details which make you a member of the brotherhood of "time navigators" because you're right where you're supposed to be.

Upon reaching the first time-check point you should be on the highway between Salem and Bridgeton, but closer to Salem. Allowing for the mentioned climb after take-off the time should be 19 minutes after take-off. Or, if you circled up over Pitman and started "timing" from the minute you picked up your heading, then your time should be 14 minutes. But in either event it is 19 minutes after your wheels left the sod field of the airport, and you're on course.

Pretty soon the Delaware River is in view and you begin looking around for the Greenwich airport. It should be off to your right. Hold your heading and upon reaching a super highway five miles on the other side of the River's edge you're ready to check your time and position again. Smyrna, Delaware, should be right underneath you.

Now here's another use for "time navigation." Any time you think you are lost, remember that you are on a time-arc, with your starting point as a base and your time out as a leg. Suppose you've been out 40 minutes when you find yourself muttering: "I don't know where the deuce I am." Imagine an ordinary drawing compass with the steel point on Pitman airport and the pencil end on the 40-minute point (Smyrna is 33 minutes out and 7 minutes more will be halfway between the 33 and 47 minute time-check points). Describe an imaginary arc, or real if you wish to pencil one on, through the 40-minute point and you are somewhere on that arc, provided you have followed your compass course and believe us this is important in dead reckoning navigation—learn to hold your heading or your navigating will become just that . . . dead.

As far as the arc at the 40-minute point is concerned, you're somewhere on it—you have to be. And the same thing is true of an arc at any point on your course. Your time-piece, wrist watch or stop-watch, tells you where you are all along the route—it's only up to you to "identify" it.

Sometimes, of course, you run into an honest reason for getting off course. A stretch of solid woods, or swamps, or large body of water may force you to it. Best ask the airport operator about the country over which you are to fly, and find out what and where to dodge. Then plot a detour trip— 45° off to right or left, and 90° to get back plus 45° when back to your course line. You will have two new headings and ground speeds to develop, and when you get them, jot them down on the edge of the chart. These detours are a handy trick up your sleeve anyway, in case of a thunderstorm on your path.

This entire collection of advice is not worth a hoot unless you are the careful trip planner. You have to figure (and hold) your heading carefully, figure your groundspeed accurately and don't forget to jot down your take-off time.

After that your compass takes you there and your watch puts the final okay on the compass. It's all a question of the time and the place—and the greater of these is invariably the time.

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First test flights of promising Martin 2-0-2 economy commercial transport indicated performance almost exactly according to design specifications. There are two versions, a 40-passenger airliner, and special air cargo model.

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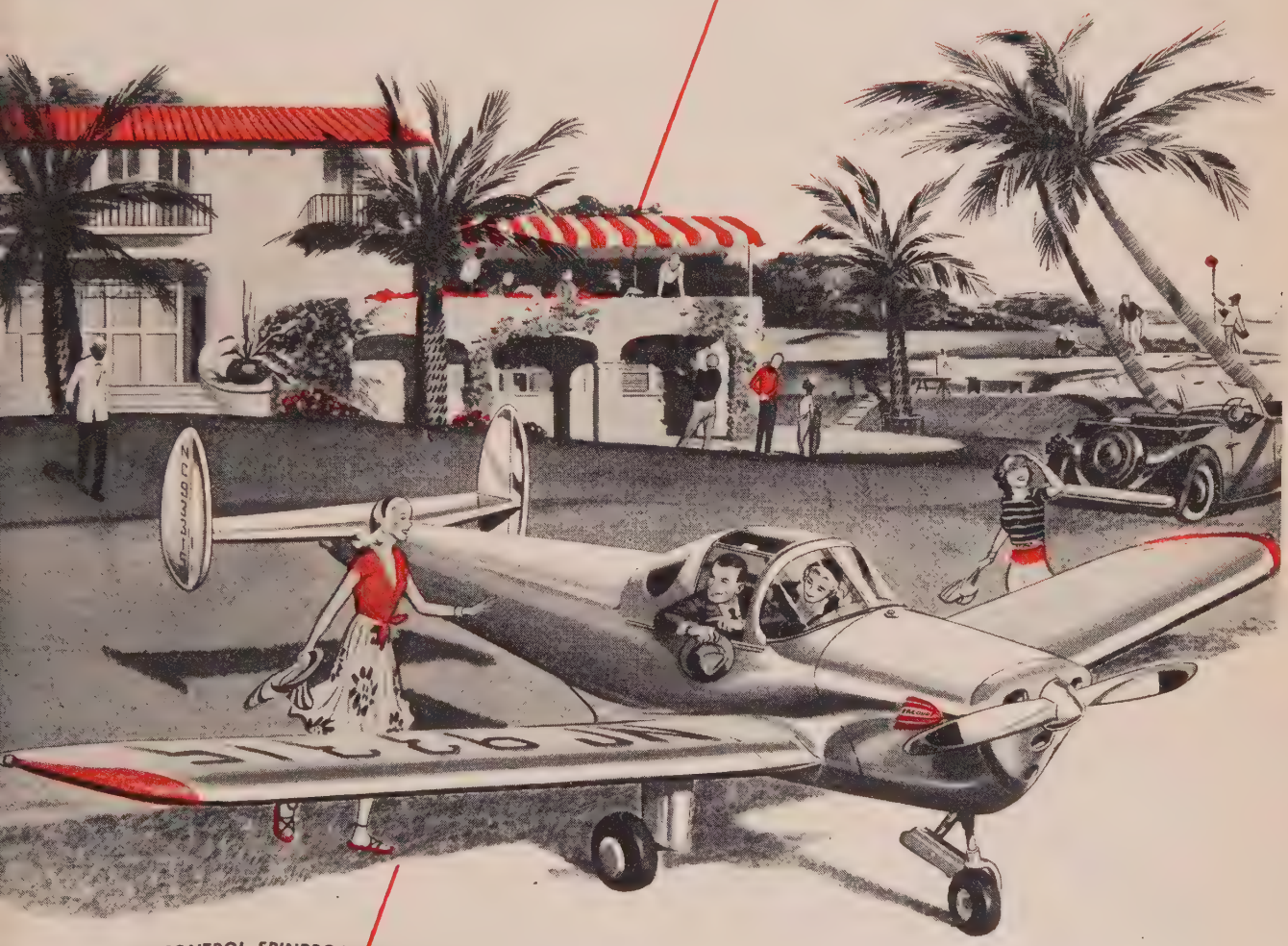
To the man who never expected to fly his own plane... the doctor, executive, food-grower, lawyer... Ercoupe is a revelation of ease and safety. You fly it with two simple controls. You're safe from the cause of most accidents, the spin. You're licensed in one-third less time than in other planes. And then —new pleasure and profit open up before you, and more than make up the cost! Thousands of successful people fly Ercoupe, the leader in sales to individuals. Try it at a nearby airport!



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Second Best

(*Continued from page 30*)

are caused when a breeze hits a hill and is deflected upward. They furnish rising currents for sailplanes near the ocean and in windy, mountainous country.

One advantage that heavy-airplane pilots have over *Cub* enthusiasts in their first sailplane flights is the habit of making wheel landings. With a single wheel for a landing gear, or a skid and no wheel at all, a full-stall landing can be dangerous. My "Zanonia" has an approach speed of 70 mph, and I can come to a full stop in as little as 100 feet from the time I touch the ground on a soft field. I do this by throwing the stick forward and grinding the skid into the ground. There is no possibility of nosing-up.

I always try to land at airports on cross-country soaring trips. It is much less work, and can sometimes save the pilot money. A sailplane landing in a bean field does little damage, in itself, to the crop, but curious spectators milling around after the landing can wreck a lot of vegetables. In the 1940 Elmira contest, I made nine cross-country flights and finished seven on airports. One was on a golf course and the other in a pasture when I had flown 100 miles off the end of my maps. That 8-hour flight established the current national distance record of 290 miles from Elmira to Mineral, Virginia, and won me $1,000 in prize money.

There is usually much more planning in a soaring contest than in the average Sunday afternoon lightplane hop. A heart-to-heart talk with the Chief Meteorologist is a must. He can tell at what time thermals will start to form, when thunderstorms will probably build up, and at what time of day the winds will blow away the rising air currents. How many "Sunday pilots" check with the Weather Bureau before each flight?

Much of the weather data about thunderheads and their dangers to transport planes is being learned with gliders. For months an experiment has been underway at Orlando, Florida, where complicated recording instruments in two-place sailplanes are deliberately flown into thunderheads to chart the pattern of turbulence in the clouds. I've used the extreme lift of these thunderheads to good advantage in many a contest and found it the best way to get a lot of altitude in a hurry. These clouds are dangerous only if hail is encountered (that will tear a light sailplane to pieces), or if the pilot lets his air speed build up above the red line. During the Wichita Falls contest I went into a smooth cumulus cloud that was just forming at 4,000 feet right over the airport. Less than 10 minutes later I popped out of the top at 14,000 feet. I glided cross-country for 40 miles without encountering any other lift. Then I went into the base of another cumulus at 4,000 and climbed back to 14,000 feet. I iced up both times, but the electric turn-and-bank indicator plus a panel full of instruments used solely in sailplanes made this flying fairly easy. I got 80 miles that day, and was the only pilot to get away from the field.

Some day I hope to get a "ride" in a Link instrument trainer. I've had nearly 100 hours of rough cloud flying in these sailplane contests, and have more or less taught myself to fly instruments. I don't recommend it. The first day I ever got into a cloud was over the desert near San Diego. That was before I'd done any instrument practicing, and I wound up in a screaming spiral dive. I finally forced the ship off into a spin and broke out at the bottom of the cloud with plenty of room for a recovery. The very next day I bought a turn-and-bank and started to teach myself to "fly the gauges." I practiced "needle, ball and air speed" when I was the only pilot in the air along the San Diego cliffs by putting a piece of cardboard over the windshield.

Flying with the birds is not a fanciful dream. I've had it happen frequently. Near

San Diego one day two eagles came to join me in a thermal at 7,000 feet. One bird flew in close within my wingtip to take a good look at the glider, and then pulled away to join his partner. They climbed with me to over 10,000 feet and then headed out cross-country on their own. During the Army glider program at Twentynine Palms, we were able to pick out many an otherwise unnoticed thermal by watching the buzzards spiraling upward. Many of the birds seemed quite annoyed when we crowded them out of the thermals, but I know of no instance of a glider being attacked by a bird in the air. The present day sailplanes are so well designed that they will outclimb either an eagle or a buzzard in a thermal.

The one pain-in-the-neck of sailplane flying is getting into the air. Power pilots don't have this trouble. Once he's 1,000 feet high, any good sailplane pilot is on his own, but the first 1,000 feet are tough. Auto, winch and airplane tow are the most common launching methods. Auto towing is fine for broad, dry lakes and airport runways. Winches are expensive to build, and are most practical for small hilltop sites. Airplane tow is by far the best all-around launching method. Any pilot who tows sailplanes quickly learns the fundamentals of soaring to get the most altitude in the least amount of time. Many tow pilots at Twentynine Palms could ridge- and thermal-soar their clumsy-looking L-1-A towplanes with the throttle closed right along with the gliders.

Two Eastern Airlines Captains competed in the 1946 meet at Elmira. Shelly Charles has been flying sailplane contests for years between passenger runs along the East Coast. He finished fourth in the meet, and his partner, Fritz Compton, finished second to me. These two pilots are but a few of the airline chauffeurs who feel that they are improving their flying technique in sailplanes.

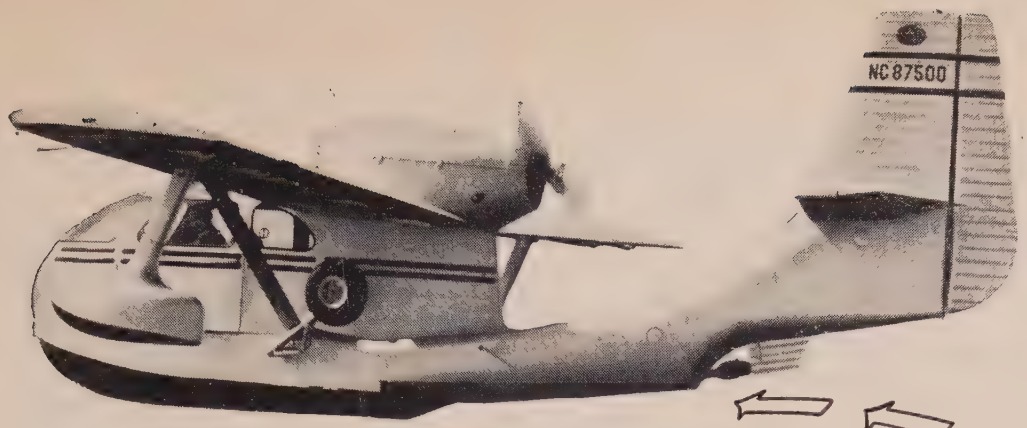
"It always gives me a nice comfortable feeling to be sitting up there in front (of a transport) and know that I could stretch a glide if I suddenly lost my power," says Captain Charles. In Iraq before the war the late Lewin Barringer, former head of the Army glider program, nursed a Waco cabin plane nearly 100 miles further than his gas supply permitted by ridge-soaring along the face of a 14,000-foot mountain. If more airline pilots had at least a little glider experience, I personally feel that there would be fewer crashes like the recent one on Laguna Peak near San Diego where 21 were killed. The liner hit the top of a ridge on the downwind side. A good sailplane pilot would have given himself more adequate clearance in the windy conditions found around many mountain ridges.

Glider contests are unique get-togethers. Eager pilots plan their yearly vacations to coincide with the national meet. Many tow their gliders clear across the country to compete. I towed my "Zanonia" from California to New York for the 1946 contest. Sixty-three pilots and 42 gliders attended this meet. A "point-award system" governs the contests so that each hour in the air or mile cross-country is worth a certain number of points. A flight to a preannounced goal is worth twice the points of a routine flight, and a goal and return flight are worth four times the regular points per mile. Should you break a national record, there is a bonus of 500 points. That's why Clarence N. See, New York test pilot, and I took a try at the national goal and return record of 40 miles originally held by Chet Decker. We flew our two sailplanes to Dansville, New York, 52½ airline miles, and had one of our ground-crew boys take the airport manager up in a lightplane to prove officially that we got there. Then we flew back to Elmira under a beautiful cloud street at 6,000 feet. We made the last 40 miles in a straight glide at 100 mph in wingtip formation.

The secret of winning contests is to get in the air and stay there. You've really got to work in a contest to stay ahead of some of these pilots. You've got to have a good groundcrew to retrieve you. A good ship is a must, and better-than-average instruments are essential. And you've got to know exactly what performance you can expect from your plane. Many a time I've sneaked across the fence of an airport with 20 feet to spare after coming across town under 1,000 feet rather than land in a cow pasture. I landed at Harrisburg, Pennsylvania, in the 1940 contest and rolled up to the hangar doors in front of a crowd waiting for an airliner to arrive. Had the doors been open I could have rolled safely inside, the control of a sailplane on the ground is so good. In spot-landing contests, as many as a dozen planes often come to a stop within a foot of the spot.

Even in weak weather conditions, some good flights can be made. In the longest flight of the 1946 contest, I landed at the Bellanca Airport in New Castle, Delaware, after sweating clear across the state of Pennsylvania never over 2,000 feet above the ground. I shouted out the window as I crossed the hangar at 200 feet for someone to come out and watch my landing to make

(*Continued on page 80*)



Each new Seabee that flies away from Republic's factory at Farmingdale, N. Y., has Shell Aviation Fuel in its tanks . . . AeroShell Lubricating Oil in its engine . . . and AeroShell Greases lubricating its control elements and landing gear.

Flyaway Farmingdale ...WITH SHELL!

Getting a Seabee off to a good start is as important to Republic as it is to the plane's new owner. This is confirmed by the use of top-quality Shell aviation products for all factory servicing.

But Shell is no stranger to this unique all-metal amphibian, even as it rolls onto the runway for its first flight test. Shell lubricants, metal-working oils, fuels and hydraulic fluids play an important part in the production of airplanes at Republic!

Whether you fly a Seabee or any other personal plane, it deserves the best in aviation fuels and lubricants . . . it deserves to fly with Shell.

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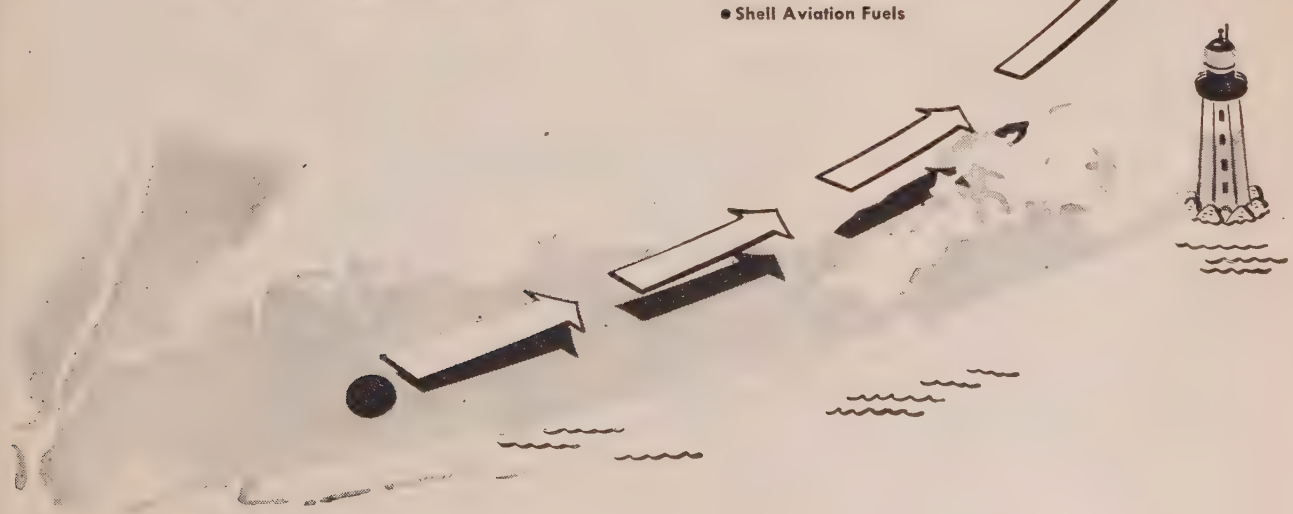


Amazing Airphibian

(*Continued from page 31*)

steering for highway use is done via the same wheel as one flies with. The mechanical hookup between the engine and driving wheels is at present mysterious. (Could be front wheel drive.) Chains may be fitted for winter highway driving and ice runways.

The back half of the craft consists of the rear half of the fuselage and tail unit and the wings and cabin top, all in one unit. From the slanting struts running from the underside of the wing to the bottom of the fuselage, vertical struts also run down terminating in small rubber tired wheels. These may be slid up and down in the vertical tubes and when down are designed to support the wings when detached from the coupe. The tail wheel is only used in emergencies or when the rear portion is on the ground. In the latter case the tail wheel is extended by turning a small crank on top of the aft section of the fuselage just ahead of the vertical fin. This extends the tail wheel and a short section of the bottom of the fuselage so that the fuselage is held level and in position for attaching to the coupe. After attaching, the tail wheel is again retracted into flying position by the same hand crank.

The wings, a standard NACA section, are fabric covered and equipped with slots and flaps. The rear portion of the detachable fuselage is also fabric covered. The plane is believed to be spin proof. The conversion of the plane into coupe and *vice versa* takes less than five minutes and is done without benefit of special tools, extra hands, or blueprints. The touch of the special Fulton magic is shown in every part of the *Airphibian*. As for example—in the little matter of removing the propeller from the nose of the coupe. A special built-in wrench spins off the propeller with a minimum of effort for storage on a special fitting on the side of the detached fuselage, when the plane is grounded. A neat flattened conoid covers the propeller shaft after the prop has been removed.

The coupe part of the *Airphibian* literally crawls with ingenious items. This two-place car is nicely appointed with such luxury items as brown leather quilted upholstery, cigarette lighter and ash tray, soundproofing and heating and ventilation units. A large windshield wiper, real tail-light, make it difficult to tell where the car ends and the aircraft cabin begins. Headlights just under the nose double for landing lights and two small lights mounted in the front of each forward wheel pants serve as width-indicators for oncoming (automobile) night traffic.

The coupe part of the *Airphibian* was tested for several thousand miles over all sorts of back roads around Newtown (Conn.) near where Mr. Fulton lives. (he commutes by air daily from his home in a standard light plane) and occasionally curious local residents inspected it at close range. For the inevitable question as to what the thing was, a stock answer was prepared. To these curious it was merely an "engine test stand." Sometimes it worked, but not always . . .

On one of these surreptitious road tests, a gangling farm hand sauntered over from his tractor to inspect it. Receiving the stock "test stand" answer he looked amused and as he left he tossed back over his shoulder at the startled test crew. "That's the first engine test stand I ever saw with an airspeed indicator like we had in the Air Corps." As I said it sometimes worked but NOT always.

The rather elaborate instrument panel contains standard flight and engine instruments plus radio as well as certain navigation instruments. The complexity of the panel in some measure is due to the fact that there must also be "auto" instruments as well as aircraft instrumentation. In contrast to the complex instrument panel the imagined confusion with brake and clutch pedals and aircraft rudder pedals and foot accelerator is a non-existing point. The control system is a single wheel design (no dual controls) and the clutch and brake pedals also double in brass for the rudder pedals when in the air. The foot accelerator is handy for taxiing and standard for highway use as in any car.

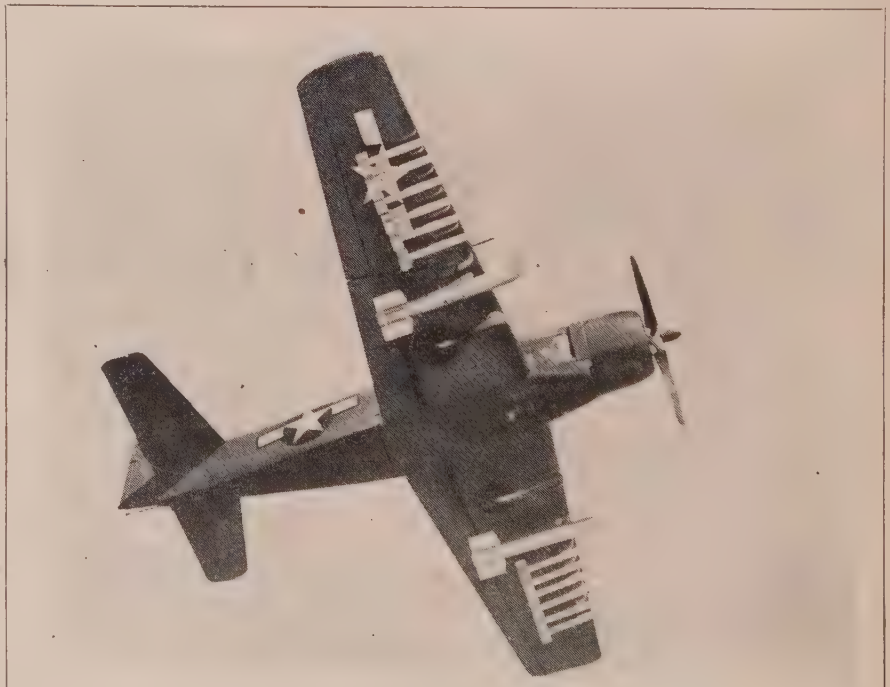
At the time of writing the *Airphibian* had barely 10 hours in the air under the expert test flying of Fulton himself (he has over 3,000 hours in his log book) and Frazer Dougherty, (pronounced Dockerty) ex-AAF B-25 pilot. These two pilots have flown the ship under its "NX" number and after a thorough wringing out will complete all flight tests for it's ATC and NC license, expected within a very few months.

On the ground the *Airphibian* has a comfortable "get there" speed of 45 mph while in the air it rips along at almost three times this rate. Fully loaded it weighs about 2,200 pounds, including 30 gallons of fuel. The powerplant is more powerful than that of a Cadillac (could be a 150-hp Franklin), the body is lighter than that of a Ford. Three levers only need connection during the car/plane change-over and when the coupe has been moved away from the wing-cabin-top-and-aft-fuselage section a snappy canvas top is raised from the back of the coupe covering the baggage compartment and the passenger section and attaches to the top of the windshield. More Fulton Magic.

In the air, the *Airphibian* is unusually steady and stable. Landings may be made on any two of the wheels as well as the four together—the front wheels, back wheels, or two right wheels or the two left wheels. Take your pick, but rest assured there will be no bouncing, ballooning, swerving or weather-cocking in a cross wind. The ship seems to glide solidly at about 60 mph and then flares out smoothly for a touchdown at around 45-55 mph. It seems to handle smoothly and respond quickly to control pressure and should be a pleasure and effortless job building up "XC" time in it.

Robert E. Fulton, Jr., 37, boyish, genial, and amazing, with his henchman, J. M. Dicky, plus a small group of unnamed engineers, has worked miracles in the short year since work was started on the actual craft. No wind tunnel tests were run prior to its first flight so sure were they of its performance, and apparently their "slipsticks" didn't kid for it has more than lived up to its secret predictions of performance.

Mr. Fulton, a graduate architect with a B.S. degree, trained at Harvard and also studied at the University of Vienna before taking a motorcycle trip around the world in 1932-33. During the trip he took over 40,000 feet of movies which he used giving over 300 lectures in this country after his return. It was during this lecture tour, mostly by air, that he became fed up with tiring, wasteful waiting for transportation into town from the outlying airports (don't we ALL!), and decided sooner or later to DO something about it. It looks to me as though it has been SOONER rather than later.



U. S. NAVY'S DOUGLAS *SKYRAIDER*

This carrier torpedo-dive bomber is capable of variety of tactical uses. Its "attack" designation, AD-1, is justified by its armament of 12 HVAR ("Holy Moses,") five-inch hi-velocity aircraft rockets, and two *Tiny Tim* 1,000 pound rocket bombs.

Gleam in the Eye of a Navy Cadet

From the moment a Navy flying cadet arrives at his flying field barracks, his eyes and his heart are on "the line."

For there rests his first love, the plane in which he will learn many of the precise and efficient practices of Naval Aviation.

A new plane for "the line" at Naval training stations has flown its first tests—a primary trainer that looks and "feels" like the shipboard fighters some of the cadets will eventually fly.

Sleek, clean-lined, powerful, and with new safety features, this latest product of Fairchild design and engineering development is the XNQ-1. It embodies flight and safety characteristics never before attained in a plane of this type—characteristics that a farsighted Navy specified for the ideal training airplane.

Careful research and engineering skill mark the XNQ-1, as they mark all Fairchild products, with "the touch of tomorrow." These engineering skills won for Fairchild the XNQ-1 contract in a competition among the nation's topflight designers—a competition sponsored by the Navy's Bureau of Aeronautics.

XNQ-1 Navy Specifications

Tandem, 2-place, low-wing, all-metal monoplane.

Flaps, retractable landing gear.

Controllable pitch propeller.

One-piece "bubble" canopy affording all-around vision.

New, Navy-developed safety cockpit.

Power plant—320 h.p., 9-cylinder Lycoming in a Fairchild-designed "power package."

Speed—170 m.p.h.

Rate of Climb—1,000 ft. per min.

Stability and control of carrier-based aircraft.

Fairchild Aircraft

Division of Fairchild Engine & Airplane Corporation, Hagerstown, Maryland

Rocket Power

(*Continued from page 33*)

four simultaneously. If installed in a small aircraft such as a fighter, obviously any one unit could be used to maintain flight at reduced speed or altitude, or the whole engine could be throttled down to conserve fuel.

The multiple engine installation is also a safety factor of no mean proportion. If anything should go wrong with any one of the four units, short of a disastrous mishap which would damage the others, there is still more than enough reserve power to continue flight.

Every liquid-propellant rocket engine uses a fuel which either contains the oxidizer within it or carries the oxidizer as a separate liquid. In this respect the engine is independent of altitude and can, therefore, propel a fighter to an infinite distance above the earth's surface.

The R.M. engine is fed on a bi-propellant. Ethyl alcohol is the fuel proper and liquid oxygen is the oxidizer, with an electric spark plug for ignition. This is similar to the materials used in the German V-2, but is in contrast to the fuels for the German Walter 109-509 rocket engine which powered the famous Messerschmitt Me-163 rocket intercepter, and the Bp-20 *Natter* (*Viper*). The Walter power plant was fed on a bi-propellant that ignited only when combined in the combustion chamber with a catalyst. The fuels were hydrogen peroxide and methanol, with a solution of hydrazine hydrate as the chemical catalyst. This system depends upon chemical reaction for spontaneous combustion, and is very tricky to handle.

Ethyl alcohol and liquid oxygen appear to be safer fuel mixtures when compared to the German Walter engine fuels and also to the propellants used in the American *Wac Corporal* sounding rocket. The *Wac* uses analine and nitric acid, which must be handled carefully. Ethyl alcohol is in fairly common use, however, while liquid oxygen is employed heavily in welding and in steel mill processes.

The Walter engine had a maximum thrust of 3,800 pounds, which enabled it to push the Me-163 along at a clip of 550 mph during power bursts. The total duration of powered flight was about 12 minutes, but this could be stretched to 40 minutes by gliding and by operating the engine at reduced power.

Operation time of the R.M. engine would depend on the size of the fuel tanks in any particular installation but would be superior to the German figure.

Since fuel consumption of rocket engines is notoriously heavy, the rate being somewhat on the order of 1 pound per second of the propellants for each 165 pounds of thrust developed, long-range flights present a serious problem.

And even though the latest and most efficient engine designs have a stripped weight of but 25 pounds per thousand pounds of thrust, a simple calculation of the fuel required for a long flight shows that commercial application may lie well into the future.

The R.M. engine consists of four regenerative cylinders, so called because the cooling propellant returns the dissipated heat to the combustion chamber and therefore no cooling heat rejection losses are experienced.

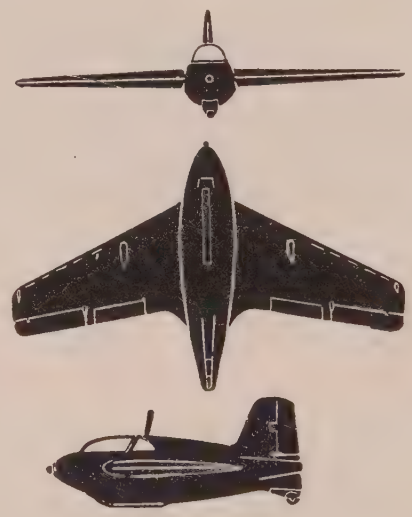
The basic priniciple of the engine cylinder is extremely simple, primarily because there are no moving parts. There is a double-chambered injector, one chamber of which feeds the ethyl alcohol into the injector jet, the other chamber feeding the liquid oxygen into the mixer.

The igniter is incorporated with the injector at the forward end of the combustion chamber so that ignition takes place when only a small portion of the fuel and oxidizer has been fed into the chamber. If ignition took place at the rear of the chamber, near the exhaust nozzle, there would be a large accumulation of propellants prior to ignition which might burn up at excessive pressures.

The combustion chamber and exhaust nozzle are usually built as one unit, since both the chamber and the nozzle must be cooled with the circulating propellant. The latter enters from the tanks at the rear inlet, runs the length of the chamber and then flows into the injector unit.

The exhaust jet emitted by the R.M. engine is about 12 to 14 feet long, very clean-cut and not bushy in appearance. Because of this operational smoothness the exhaust can be mounted relatively close to the airplane fuselage.

One of the principal auxiliaries of the R.M. engine is the centrifugal pump which handles the large quantities of fuel that must



THREE-VIEW plan drawing of the Me-163 *Komet*, first rocket intercepter to be used in combat operations

be fed to the combustion chambers in small fractions of time. In order to handle the large flows of fuel, the pump must operate at speeds varying from 7,000 to 50,000 rpm and consequently requires considerable horsepower to operate it. For the R.M. engine, the pumps operate through a turbine drive which utilizes the same fuels as the main rocket cylinders and in effect are small uncooled rocket engines in their own right. The actual unit on the engine develops up to 150 hp for a dimensional size of 5 inches in diameter by 10 inches long for a weight of only 15 pounds, a 10 hp per pound ratio.

A major consideration is the fuel-injection system and the injector mechanisms, including the delay-action valves which must have fuel-resistant seatings. The injector must distribute the fuels in the proper mixture ratio to prevent possible sudden development of dangerous combustion chamber pressure which can lead to explosion. Such explosions were very common in the German Air Force, and doubtless early experimenters in both the British and American groups have seen some of their designs disintegrate during static and flight tests.

In this connection the recent crash of Geoffrey de Havilland in his testing of the D.H. 108 tailless jet aircraft in the transonic speed range was probably due to compression waves bucking against the aircraft structure and thereby breaking up some vital fuel or control line. It possibly could have been caused by taxing the turbojet unit beyond the safe temperature point. Such combustion chamber failure is generally regarded as the cause of Major Dick Bong's crash in a P-80 during the summer of 1945.

From the standpoint of danger, therefore, and even while the rocket engine has no working parts within it, it does require rather complete and accurate instrumentation for operation and control.

It is first necessary to know the thrust that is being produced, as well as the pressures in the combustion chamber, in the fuel manifolds and the control pressures for the propellant valves and the propellant tanks.

Instruments are required to record the instantaneous flow of both the alcohol and the liquid oxygen to insure that the mixture ratio is correct.

The temperatures of the propellant flowing in the cooling space between the outer casing and the combustion chamber as well as within the chamber itself is of utmost importance. Unfortunately, thermocouples are not available to measure accurately the temperature of the hot gases of combustion in a rocket engine.

Proper propellant flow during the testing and flight operation of the engine is vital. Variation in flows has been known to produce serious trouble.

Preflight testing must therefore be done under conditions almost exactly simulating the actual mounting of a protoype of the aircraft final fuel tankage, valving and connecting lines, so as to precisely determine the pressure drops through the pressure feed system. In other words, the whole engine and its auxiliaries as finally installed in the production airplane must conform minutely to the tested prototype.

With fuel pressures as sensitive as those in rocket engines, the effect of acceleration, deceleration and zero acceleration during flight must be kept in mind. Variation in any of these conditions can affect the injection pressure and the mixture ratio.

Small rocket engines with all their accessories, fuel tanks and piping may be universally mounted and centrifugally tested, if necessary, but with larger engines this is a serious problem, which perhaps can only be overcome by slow experimental testing to determine the eventual design size and position of all the elements.

And now someone has been waiting impatiently to put the question:

"If a 6,000-pounds-of-thrust rocket engine can be built in such a small compact unit, why not build engines of 20, 50 or 100 thousand pounds?"

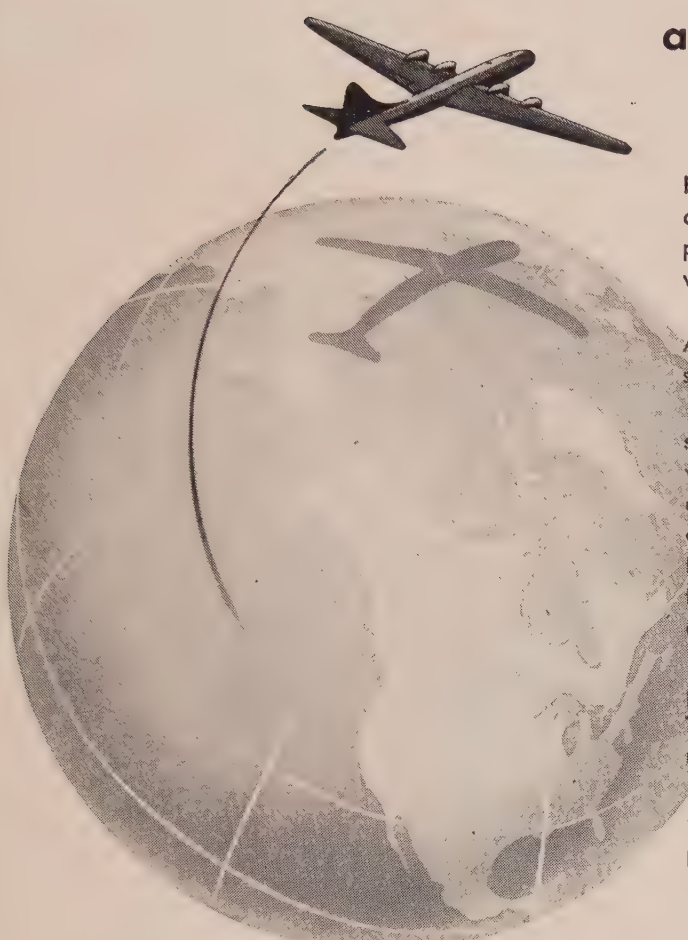
The answer is there is nothing to stop one from doing so and preliminary calculations are already in progress, with an 11,000-pound thrust project well along. Remember that the V-2 rocket engine produced close to 300,000 pounds thrust at the peak of its flight, and the engine itself is by no means large. But remember, too, that the higher

(*Continued on page 82*)

AIRESEARCH BUILDS

Dependability

AiResearch Products Helped the "Truculent Turtle" and "Pacusan Dreamboat" Set World Records



History-making flights like those of the "Turtle" and "Dreamboat" are possible only when every piece of equipment unfailingly does its job... when it is *dependable*.

That's why builders of both airplanes and the Army and Navy selected AiResearch oil cooling systems for vital engine protection.

AiResearch leadership in engine oil cooling design and production is long established. AiResearch was *first* to produce the thermostatically controlled oil cooler shutter, *first* to perfect the elliptical oil cooler, *first* with surge protection, *first* with electric flap control, *first* to build a standard Army-Navy four port valve, *first* to equip the airlines with aluminum oil coolers.

On the "Dreamboat," other AiResearch products also proved their dependability. These included intercoolers, cabin pressure regulators, actuators and other equipment.

AiResearch's ability to be *first* with *dependable* products is available to help solve your aircraft problems. AiResearch Manufacturing Company, Los Angeles 45, California.

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AIRESEARCH ALUMINUM OIL COOLER

Now used on 20 new airplanes by the following manufacturers:

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Sales Representatives: **NEW YORK,** Aero Engineering, Inc., Room 1014, 160 Broadway ☆ **CLEVELAND,** Aero Engineering, Inc., 1051 Power Avenue ☆ **SEATTLE,** C & H Supply Company, 2723 First Avenue South ☆ **WICHITA,** N. S. Chapin, 815 East Gilbert

Flying Executive

(*Continued from page 39*)

nevertheless. To sell as we do, we must do a lot of contacting all over the nation. In a business such as the food business where government regulations, crop changes and transportation problems instigate a quick-moving thus flexible industry, life at best is complicated and interesting—but requires something just as quick moving and flexible to keep up with it.

So we at Gerber Products Company looked at the airplane and found in it an answer to our widespread activities. Using the sound experience of our local airport operator to guide us, we bought the "Sky Baby," a four-place, twin-engine Cessna. After we bought the airplane, we needed a pilot—and now we've got one of the best.

How we picked the man we did, why we selected him from scores of applicants and what we plan for him, may be of interest to hundreds of young flyers who want to fly in something bigger than a Piper *Cub* and whose names are signed today to the pile of letters seeking the flying jobs that industry has available.

Although we had hired thousands of employees in our 20 years in the baby foods business, we had missed hiring a pilot.

Earle Johnson, our vice president in charge of marketing, and I sat down to discuss the problem. It seemed likely to us that a pilot could be selected with complete satisfaction by using purely business methods. It seemed to us, too, that the job of a pilot could very well be broken down into areas of responsibility, just as any job in the plant could, from president down to fruit picker.

With all this in mind, we set up the following list of qualifications.

Education. A college background or its equivalent in technical training.

Experience. A broad range of experience in flying. A commercial license and radio operator's license were "musts."

Flying Record. A record of continuous operation of all kinds of planes without accidents. (CAA and Dun & Bradstreet were our sources of information.)

Personality. Even, agreeable, with a demonstrated ability to get along with all kinds of people.

These were the minimum requirements. We decided, however, that, for our organization at least, there were certain others.

Responsibility. Ability to assume responsibility on the level of plant supervision.

Resourcefulness. Ability to solve problems efficiently and resourcefully.

Business Sense. The pilot was expected to operate within the framework of business, to use standard business methods in handling maintenance, operating costs, etc.

Public Relations. To an unusual degree, the pilot of a company plane is its representative; in many cases, its host to important customers. His sense of public relations should be well developed.

Based on the foregoing, we chose two pilots from among the astonishingly large list of applicants. And it might here be well to emphasize, these applications are important. They nearly represent the first impression the employer will have of his future pilot. The forms or letters should be neat, concise, accurate and detailed.

Then, precisely as we might do in the business world, we gave both applicants a personal interview which consisted of a chance to demonstrate their ability to meet our rather exacting standards in performance —over a 2,000-mile trip from New York to Bocha Raton and return. They acted (turnabout) as pilot and co-pilot of a chartered Cessna, i.e. the type we had ordered.

There was no question about it at the end of the flight. The one pilot just wasn't familiar with the Cessna, the type of ship we would require him to pilot. For another thing, he elected to fly in a windbreaker while the other wore a business suit. This is another hint, pilots, dress up. If it's cold and you need a flight jacket for piloting, be prepared to leave it in the cockpit so you'll look like the men you're associated with, once you leave the plane. The pilot in the business suit was Chick Childs, who had learned to fly back in 1936 in Grand Rapids. After three years of commercial experience, he had added two and a half years of instruction on military fields to his time, and after that had been contract flyer for the RAF.

We picked Childs not only because he had a spotless record on the matter of safety, and was mature in his behavior, thorough and workmanlike . . . but because he gave us a good demonstration of all these qualities.

Questioning the pilot's future, you might well ask, "what Gerber Products plans for the pilot?" We purposely selected a pilot with the qualifications to grow into a larger job with greater responsibilities. It is fairly certain that it will take a little over a year for the airplane and its operation to be woven into the everyday fabric of the company. At the end of that time, Chick will be in a position to look into his future.

It could hold a number of things. It is possible that the success of "Sky Baby" in solving the real problems of executive travel in a competive economy could lead to a fleet of planes, which would be, by virtue of Child's seniority and ability, under his supervision. It is possible that with his intimate knowledge of our industry, gained through the closest contacts with leading food executives in our and other managements, there will be an opportunity for him to create a special niche for himself in the business.

One thing is certain, the opportunity is there—just as it is for all the executives—because the pilot who is close to executives and is responsible for their welfare under a variance of conditions is a specialized executive himself.

Second Best

(*Continued from page 74*)

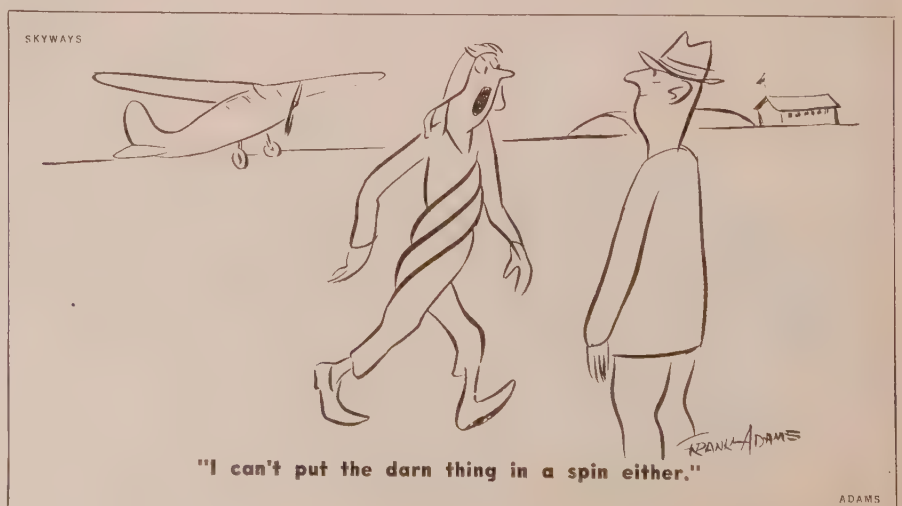
it official. When I skidded to a stop beside the hangar, the attendants asked where I was from. When I told them Elmira, they said, "You mean, *New York?*" They wouldn't believe me until I'd put in a long distance phone call for my ground crew.

If you powerplane pilots doubt the strength of thermals and ridge winds, why don't you go out and practice a bit of soaring? Take a light plane and close the throttle as you fly along the upwind side of a ridge. Then watch the needle of your sensitive altimeter for proof of rising currents.

I see no reason why soaring shouldn't be included in the primary flight curriculum, right along with pylon 8's and "S" turns. If every powerplane pilot had at least 5 hours of soaring time before being given his private license, there'd be fewer accidents on forced landings. Once you've flown a glider, there is no panic when the engine quits. "Sunday pilots" would get far better performance from the inexpensive lightplanes that they normally fly by using a sailplane pilot's knowledge of winds and weather. Pilots wouldn't get in so much trouble on cross-country trips because they'd be more alert to what was going on in the air. You can't sit back and read today's paper when you fly cross country in a glider. This glider training should be given early enough so that he'll remember it, and before the tail-skid landing technique has become a habit.

Some day I'm going out and solo one of those thrashing machines that blow smoke in your face and shake you to pieces, just to see how the other 99 per cent lives. But I'll bet that first solo flight won't match the thrill of a motorless flight. You'll never *really* fly until you get up there without a motor.

Johnnie Robinson, at 31, is the recognized No. 1 pilot of motorless planes in the United States. He is three-time winner of the National Soaring Contest; 1940, 1941 and 1946. (No contests were held during the war.) He was the first pilot hired by the U.S. Army to teach gliding to military pilots, and served as chief instructor for the gliding school at Twentynine Palms, California, where a large percentage of wartime glider pilots were trained. After three years of soaring on the Pacific Coast, he now lives in Elmira, New York, the original home of soaring in the United States.—Ed.



Ski Holiday

(*Continued from page 48*)

well as hotel accommodations for each of 20 T hangars now being started.

It is just two miles from the mouth of he incredibly deep and precipitously steep canyon that sheers upward between granite crests towering 11,000 feet high.

We were told that pilots landing there can phone Alta Lodge where manager Ted DeBoer will be glad to send a station wagon down to pick them up.

An alternative is the hope of the operators that they will be able to instigate a non-profit car-rental service whereby the visiting pilot may use an airport car at cost to drive up to Alta or in to Salt Lake.

Salt Lake also has a fine municipal field where ski parties in heavy twin-engine equipment can land. From there, the station wagon to Alta will be met at the Hotel Utah.

Let us warn you that the accommodations at the Lodge for 50 persons are already reserved ahead, in some cases into 1948, so be sure and make your reservations ahead if you plan to stay overnight.

But no matter which ski resort you want to visit nowadays there's a good chance that not far away will be some hardy optimistic cuss trying to run an airport and being that sort of guy naturally, he will likely go broke trying to make life easy for skiers who want to borrow his car, or need taxi service.

Fortunately, we had found one of Utah's best skiers taking pilot training under the GI Bill of Rights at Thompson Flying Service, Salt Lake, one day during a business trip.

This was David Quinney, nationally known skiing sportsman who was ready at the drop of a hat to call his sister, Mrs. Janet Quinney Lawson, for a trip to Alta for a day of skiing when it began to look like we could get down there for a pre-season visit to Alta.

They met us at Alta Air Park, driving out from Salt Lake.

We got up at 6 a. m. and were in the air at 7. A nice tail wind brought us the 250 miles in two hours flat and we landed at Alta at 9 o'clock sharp.

Over-cruising it a bit, the *Ercoupe's* Continental engine used 10 gallons of gas at 2350 on the trip. Twenty-five miles to the gallon. No oil. What! no oil? Yep, this one was overhauled and we got the oil leaks stopped at about 50 hours at a quart an hour.

The strip looked narrow at first glance because of a culvert that intersected it near one end, but there was room to land a couple of times in a small airplane and the runway was almost unbelievably smooth and just soft enough to feel like down instead of self-draining gravelly mulch that never makes mud. The airport's 90 acres are a flat plateau, and you could land anywhere without damaging a ship, except in the ditch.

We found Janey and Dave "rarin'" to go, so tarried not. At 9:30, two and a half hours and 250 plus 10 miles away from starting point, we were in snow up to our necks off the porch of the Alta Lodge. Ted DeBoer, manager, and his wife, Eileen, made us welcome.

There's the beauty of an airplane for this sort of thing. We were skiing before 10 a.m., not the least bit tired or fatigued in any way by the trip down. The romp started at 9:30 a.m. and by 4:30 p.m. we'd had a big full day, crammed with action and excitement and thrills and beauty. That's about how much time any winter sports fan gets on the average if he lives within 20 miles of a ski resort and drives out for a day.

With an airplane you get the same winter sports, but can come in a much greater distance if you can pick the weather like magicians and have a couple of swell friends like Dave Quinney and Janet Lawson, strategically located so they can meet you at the airport and drop you back there when ski time is over.

Of course, in November the sun sets around 5:30 over the Great Salt Lake and it's reasonably dark by 6. However, we picked a nearly full moon which came up in the early evening and after leaving Alta Air Park, we flew north along the eastern edge of the great Salt Lake watching one of the most spectacular sunset settings through the most beautiful hours of the day from the finest seat available. And as it grew dark the moonlight started filtering in over our shoulders in a soft silvery glow, to light up the instrument panel and show us plenty of ground detail, so that the night end of the trip was no more ominous than a pleasant jaunt in calm air during the daylight.

And if you haven't flown in the smooth air of a quiet, still cold moonlight night, you ain't never flown in smooth air at all.

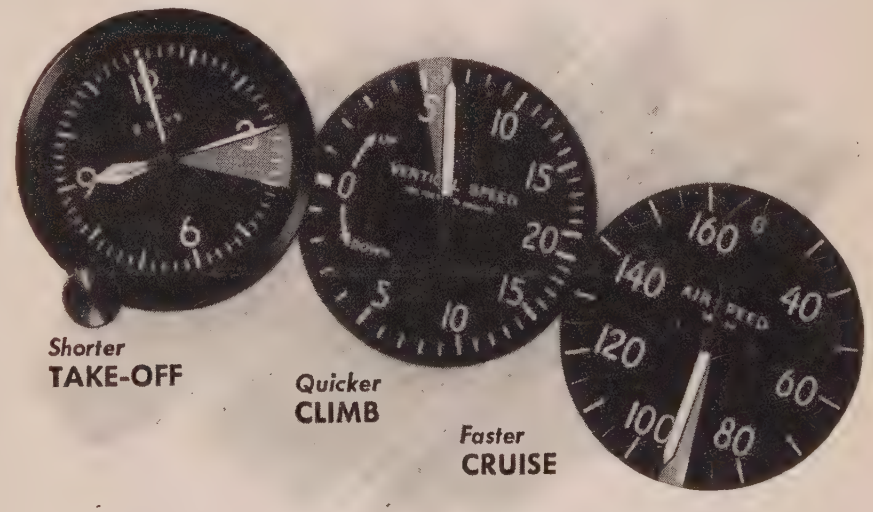
There were many open fields of dry farm wheat ground where a forced landing would have been as easy in the moonlight, almost, as in daytime, and, of course, later on when the ground in the valley is covered with snow, if you fly it with skis attached to your airplane, the world is your runway. You can't imagine what a trip like this is going to do to the emotions evocable by beauty. The sunset over the lake, with lacey clouds turned to every color of the rainbow in a fairyland of inexhaustible wonder, makes it seem as though you are flying through a hauntingly beautiful land of dreams and the glow of the moon at near-full was enough to outline the mountain ranges, snow topped and brilliantly white, against the darker sky as though they were etched with ivory on a rich ebony bowl that covered half the world.

Weather permitting, there's no reason these trips into the Utah and Idaho mountains can't be made from anywhere on the west coast in two days and if you don't have your own plane, there's Western and United Air Lines schedules into Salt Lake that will get you two full days of skiing at Alta on a Saturday and Sunday weekend away from the office turmoil.

But if you plan to stay overnight—be sure to make reservations ahead, or arrange to stay in the city.

There are unquestionably many other resorts that can take care of visiting airmen and their guests. Sun Valley, Idaho, and Alta, Utah, happen to be the only two this writer knows well.

Pilots interested in more information can write Ted DeBoer at Alta and Mr. Pat Rogers at Sun Valley for full information on accommodations and rates charged for guests. Other resorts must surely have information on available airports, too. But whether you write for information or not—*do* write down on your list of new year resolutions "I'm going to treat myself to a ski-holiday by plane." It's a "must."



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Keep It Clean

(*Continued from page 41*)

from his own experience of how even a responsible maintenance man can get caught off base. His outfit was given some sample bottles of a cleaner that was supposed (verbally) to be absolutely safe for plastic windshields. The way he tells it: "We gave a bottle to one of the mechanics and had him clean the windshields with it. He reported excellent results; the dirt disappeared without too much urging and the Plexiglas really sparkled after he finished. The only trouble was that a day or two later a man flying one of the planes reported that he liked the new tinted windshields we had installed. We gave a quick check and discovered that the cleaner had turned the Plexiglas a light blue and the tint that the pilot liked soon deteriorated into a deeper color that made it necessary to replace the whole assembly. Now we use soap and water."

Practically all postwar personal planes have windshields and canopies of Plexiglas or Lucite. Technically, these are acrylate or methacrylate base plastics. These acrylic plastics are more resistant to discoloration than the cellulose acetate base plastics used in some pre-war planes, but they are affected by certain solvents which soften and "craze" them, a process that leaves them looking as though they have tiny sub-surface cracks.

Plastics manufacturers warn against the use of gasoline, alcohol, benzene, acetone, carbon tetrachloride, fire extinguisher or deicing fluids, lacquer thinners or other solvents and stress not using standard glass window cleaning compounds because they may contain these solvents. Using solvents near plastic windshields invites trouble if solutions spatter or drop on the surfaces.

The recommended way to clean Plexiglas or Lucite is first remove dust with a soft, water-dampened cloth. Then flush with a warm, clean and mild solution of soap and water and dry it with a soft cloth or chamois. Oil and grease spots may be removed with a soft cloth soaked in kerosene or hexane followed by the soap treatment. Never rub hard on plastic surface with a dry cloth because the friction can cause tiny dust particles to scratch it and also it sets up static electricity which attracts dust and lint.

No matter how careful a plane owner may be, plastic windshields do get scratched or acquire a gray film. Manufacturers recommend the use of automobile wax polishes rubbed on lightly to give a high gloss, fill in tiny scratches and leave a protective coating that helps prevent abuse. The use of a few drops of ammonia in soapy water to help remove the gray film is no longer recommended because too great an amount of ammonia may injure the surface.

Getting on to the rest of the plane, ex-Air Force men remember that they achieved excellent results on metal surfaces with high pressure steam cleaners using soft soap or commercial preparations. Swell for the big planes with lots of surface, but for the small planes it's no dice; too expensive. One maintenance man says that the best way to clean a plane is to follow the manufacturer's recommendations . . . then he remarks that he just received a 20-page booklet from a company that tells how to clean its products. "I looked through the 20-pages, and if you don't feel like spending the money for special cleaners it all boils down to brushes, soap, water and lots of time and muscle."

". . . And on this model, the wings not only flap but you can detect a slight crowing noise."

There are, however, little extras that do keep a plane looking spic and span and give its components longer life. On metal surfaces some distributors recommend the use of a good metal polish every so often to reduce the possibility of corrosion, but here, again, beware of caustic-base polishes or you may get the effect you're attempting to avoid. Waxes put out by the manufacturers of the various fabric finishes help preserve these surfaces against deterioration and keep them looking sprightly. Probably the best return a plane owner gets from hand-cleaning his pet is that such action involves a close inspection and thus he always knows its surface condition.

Stains on seats and upholstery can be removed with soap and water or commercial upholstery shampoos, but stubborn stains may demand a knowledge of their origin and special substances to remove them. Nothing ruins a fabric faster than the accumulation of impregnated dirt and grease.

One of the obvious things that plenty of plane owners seem to overlook is the fact that dirty landing gear can cause bad accidents. Mud is no respecter of wheels and brakes, and the superficial cleaning some planes get on wet days may leave a deposit for future troubles. Planes with wheel pants require closer attention because of the danger of overlooking accumulations of dirt.

On larger planes equipped with air-oil struts, exposed piston surfaces should be wiped clean. The recommended method is to use a cloth dampened with the same fluid used in the strut. Dry or dirty pistons soon cause tearing gland seals and a leaking strut, beside being unsafe in itself, doesn't help the lasting quality of airplane tires. Gasoline, mineral oil base hydraulic fluids and other distillates soften rubber, and the longest lasting tire, other factors being equal, is the one that's kept clean.

The most important point to remember in airplane care is that the quickest way is not always the best, and most often not the cheapest. A good soap can't hurt, but if commercial preparations are wanted for speed, following the manufacturer's recommendations is always the safest method.

And because aviation is a business and no longer an expensive hobby, the boys in it might well remember that cleanliness is next to the pocketbook. The customers reach faster for the cash when they can fly in clean, good-looking jobs.

Rocket Power

(*Continued from page 78*)

the thrust rate, the higher the fuel consumption.

A curious thing in connection with the development of larger rocket engines is that their physical dimensions do not increase directly with the thrust. If injectors can be made which will mix and inject the propellants in the same length of time for a 100,000-pound engine as for a 1,000-pound one, then the size of the combustion chamber can remain the same. In practice, however, it is usually found that extremely large flows of fuel cannot be handled as expeditiously as smaller ones.

But the exhaust nozzle size is a function of the mass of gases flowing through the nozzle throat, so that as the engine becomes more powerful, the nozzle throat area must increase in size.

A theoretical analysis of the various elements of rocket engines from 100-pound thrust up to 5,000,000 pounds shows that at the 500,000-pound mark there is still a semblance of an enclosed combustion chamber with a tapered throat nozzle. But for the 5,000,000-pound engine, the mass of the gases is so great that for a throat diameter of 12 feet, the exhaust nozzle diameter is more than 25 feet! Fuel feed lines for such an engine would assume the proportions of city street water and gas mains.

All of these calculations are for the currently used propellants, and obviously, the engines in the very high horsepower class would be mechanically impractical to build and must wait for more efficient fuels or energy sources, such as atomic energy.

How do you control an airplane powered by rocket engines? Within the atmosphere and at subsonic speeds, with conventional airflow controls. Above the stratosphere and at supersonic speeds, with a movable tail cone or with controllable deflector plates mounted in the gas stream of the exhaust jet. The German *Natter*, a vertically launched interceptor using the Walter 109 509, had horizontal deflector plates which were linked to the stubby plane's tail control surfaces.

The R.M. 6000C4 rocket engine is being planned for installation on a number of experimental fighters and guided missiles. These include the Bell XS-1 supersonic flying laboratory, the Bell XS-2, Douglas XS-3 for Navy, projects by Boeing, McDonnell, Edo, Lockheed, Republic, etc. as well as Boeing's GAPA, ground-to-air pilotless aircraft, and other guided missiles. It may take some time before any of these get into production and operational aircraft groups are fitted with them. But looking back to 1940 would you have believed that we would have P 80 jet fighter squadrons in service by 1945?

When one of our biggest engine manufacturing companies which has been conducting gas turbine research for the past few years suddenly drops this phase of their activity to concentrate on rocket engine development, we have food for thought.

The rockets are already here as powerful propulsion devices for both small and large projectiles, in the air, on the surface and even as under-water or hydrobombs. They will be coming into wide use as aircraft power plants in the near future, first for military planes and eventually for commercial air transports.

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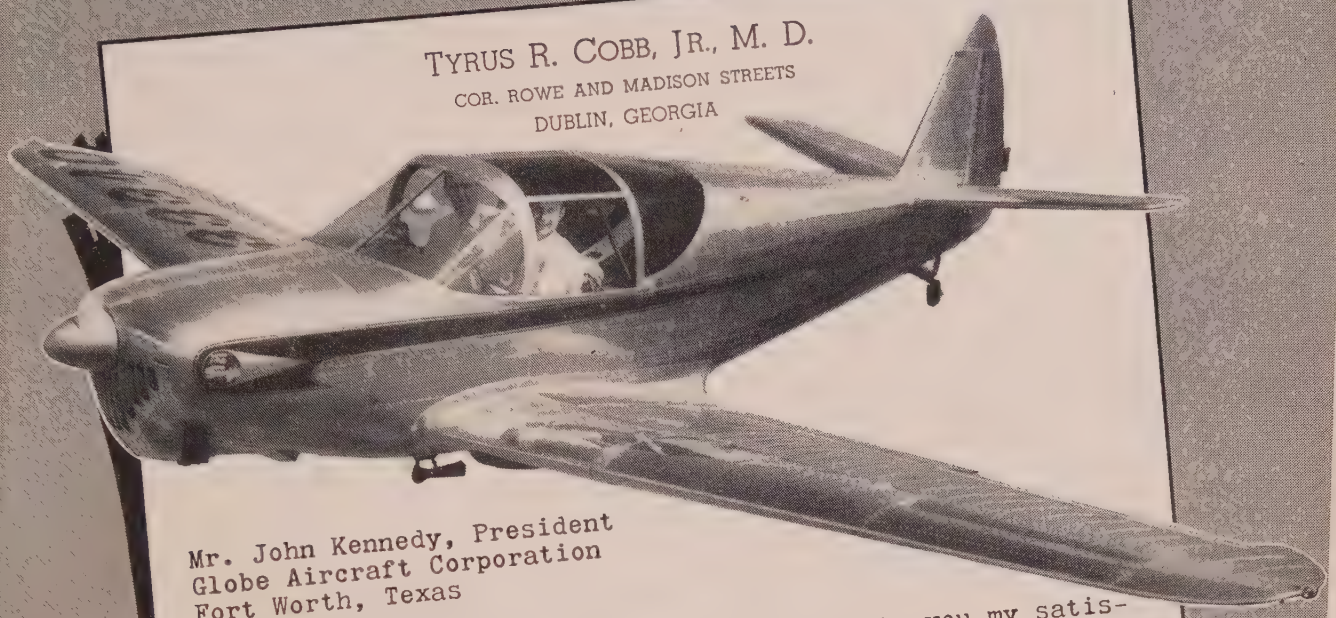

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GLOBE AIRCRAFT CORPORATION

JOHN KENNEDY, President — FORT WORTH TEXAS

Think Before You Fly

(*Continued from page 42*)

John H. Geisse of CAA, assistant to the administrator, made this clear in emphasizing that "it is upon the rated instructors that we must rely to see that each pilot is not only properly trained, but is also properly apprized of the hazards of flying, and of his own limitations."

Despite good instruction and the modified requirements for aeronautical skill, a sizeable percentage of potential private pilots still fail to make the grade on their check rides—because of being in too big a hurry.

It may seem like a lot of nonsense to you to have to fly an around-pylon eight, for example, at a specified altitude, entering the pattern downwind with the first turn into the wind, staying equidistant from the pylon, correcting for wind drift and rolling out of the turn lined up for the next pylon. But this maneuver is designed to trip the careless pilot. If you can't plan out and execute a simple figure-eight pattern, your flight examiner cannot reasonably be expected to assume that you possess good airmanship.

Being in a hurry is no time-saver in the air. The pilot who has no time to prepare a flight plan before going cross-country, or who takes off without thoroughly preflighting his airplane, is a sure candidate for a front-page story.

Before taking that check ride, look back and analyze your recent flights. If you have been flying conscientiously with a definite schedule, carefully planning each flight toward reaching a definite goal of achievement, chances are that you have instilled fundamental thinking habits that will pay dividends of safety and confidence in your future flying. If you have been a bit careless now and then, rushing through your "practice" period in order to joyride a while and cutting corners in the traffic pattern to make up time, you'd better turn over a new leaf.

While a recommendation of your flying proficiency from a rated instructor is in your favor, remember that the flight examiner is interested not only in how you fly, but in how you *think* in the air. A student whose coordination is slightly rough but who looks around plenty and plans his flight well has a better chance of turning in a good ride than the smoothie who does a nice sequence of maneuvers at the wrong altitude or in restricted areas and flies as though there were no one else in the air.

You'll be graded on forced landings, but CAR doesn't say you fail the ride if you can't make that field. However, you can be flunked on gliding turns if your handling of the ship during a simulated forced landing is on the dangerous side.

Spot landings are *emphasized* now, so if you can fly well enough to hit the spot the required three times out of three the chances are that you can get into some kind of a field when the examiner cuts the throttle. Remember that the way you get into that field is fully as important—if not more so—than your selection of an emergency site. Go in crosswind if you have to—but let the examiner see that you know what you're doing.

Too many applicants fail to realize the importance of the new stall sequence. Stalls—along with "slow flight"—are included in the flight examination not as pretty maneuvers to be done to somebody's liking, but to demontsrate three important things: first, that you know what a stall is; second, that you can sense the approaching stall and prevent it before or just as it begins to occur; and third, that you can effectively recover from a complete stall in a normal manner and with minimum loss of altitude.

Just what is a "normal stall recovery?" Without going into the aerodynamics of the stall, remember basically it occurs when and only when the wing tries to fly at a too-high angle of attack. So, first reduce the angle of attack with forward stick. To prevent a dropping wing from developing into a spin, hold the airplane's nose straight with rudder while reducing the angle of attack. And last, return smoothly to level flight with neutral controls when you feel the airplane flying again. Throttle coordination during recovery is good practice.

One pilot recently checked by the author managed to execute a fairly good series of stalls, but showed a decided tendency to skid and slip his turns. While performing the stall maneuvers as such, he concentrated upon them sufficiently to effect fair recoveries. But, during a forced landing later this pilot stalled out in a nose-high turn (with a touch of bottom rudder thrown in) and made the fatal error of hauling back on the stick to keep the nose up. Luckily there was 600 feet of sky left to bring the ship out after a half-turn spin!

SKYWAYS

BOSERMAN

"No, I wasn't Flying. I thought you were."

Speaking of spins, remember that the examiner is watching your recovery for smoothness and effectiveness, rather than precision. While it is good training in orientation to come out "dead on" your entry point, you are not required to do so under the new regulations. But don't build up too much airspeed in the recovery, and relax your rudder pressure after stopping the spin—don't "barrel-roll" out.

You may say "why practice spins and stalls when probably I never will perform these maneuvers after I get my license—I intend only to fly straight-and-level on cross-country trips?" The answer is as simple as the question is old; you may have to make an emergency pull-up or quick turn and should be prepared to handle the emergency in a safe manner. Only by flying your ship occasionally through maximum-performance maneuvers can you accustom yourself to the feel of the ship in unusual attitudes.

A word about steep turns—use extra power to offset the additional wing loading and don't come in too soon with added back pressure or you will end up with a sloppy, nose-high maneuver which will not qualify.

Each time you demonstrate a maneuver give it your full and complete attention. While you are doing your clearing turns be thinking about how you are going to enter the maneuver, execute it and recover from it. If you get off to a bad start the whole maneuver will probably go sour.

If your airmanship is above par you will be able to enter any maneuver smoothly and efficiently without too much conscious effort. This means that your subconscious has been trained properly to call the right signals at the right time; but don't rely on that subconscious quarterback too much until you can fly well with conscious effort, which adds up to thinking and planning ahead.

Take your time on your check ride—the examiner has (or should have) the patience to bear with you while you execute adequate clearing turns or maneuver the ship away from congested areas before doing a spin or stall. This does not mean that you should wander through the sky haphazardly; an ability to plan ahead efficiently and complete your check ride with minimum waste of time shows good airmanship.

Lastly, and perhaps most important, is your preflight procedure. Demonstrate your ability to check over an airplane thoroughly before taking off. Such habits are not intended merely to put the examiner in a good frame of mind, although it helps. This should be a regular part of your daily flying.

A pilot who otherwise demonstrated that he could handle an airplane safely and with considerable skill recently earned a disapproval while trying to run off his check ride during a lunch hour period. After propping the ship he remembered that he had forgotten parachutes; out he hopped, leaving the engine running, to get the 'chutes. The ship had not been gassed—in fact, it was only quarter-full.

"Oh, I think we have plenty," was his response when questioned about the low fuel supply.

Taking off without an adequate warm-up period was mistake number three on this pilot's list of boners. Needless to say, his lunch hour was definitely wasted.

Many applicants try to excuse their inability to make spot landing within the required 300 foot area by bemoaning the fact that they "have been practicing solo too much." It's next to useless to explain that weight has nothing to do with a ship's gliding angle. One pilot explained his tendency to undershoot by complaining that "the spot is too far down the field."

Another, who had just performed an exceptionally good 720-degree steep turn, apologized for flying through his own prop wash; he thought there was something wrong with his technique.

The classic error occurred when a hapless student, after turning in a competent bit of airwork, came back and made a perfect three-point spot landing—however, he made it at the wrong airport.

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S-247

Sky Hunting

(*Continued from page 52*)

lands of sagebrush and bunch grass, lava and rocky ledges, the home and hiding places of the coyotes. Off to the west was silhouetted the glacial-coated Cascades with their forest foothills, and to the south and east, the juniper-covered knolls and flatlands of the high desert.

Scenery wasn't the only view, however. Below the wings the hunters saw game, too . . . antelope, hundreds or more of them, streaking across the desert. For here, in Oregon's Lake County, is found the largest herd of pronghorn antelope remaining in the U.S. The rolling country below, over a mile in altitude, bordering on Nevada, is the habitat of the pronghorn, a spot of isolation not found in any other portion of America. This territory is a game preserve, 960,000 acres in extent, where the antelope are protected from the hunter—except for a short open season every fall.

At the sound of the plane overhead, the antelopes fairly flew over the ground, their white tails spread out like dinner plates to flash a warning signal of the approach of unknown danger. In the manner of killing the proverbial two birds with one stone, Ballantine and Giles counted the herds of antelope, then reported their count to the Game Commission.

On the tiny plane cruised, its two occupants straining for sight of their prey, the coyote. This prairie dog is not an easy animal to spot quickly. That is, unless he's moving. The coyote resembles the wolf, being a dull, yellowish grey in color, with dark clouded spots on his back. With this coloring, the animal is apt to blend into the sagebrush and greasewood patches that are his hiding places. Ideal hunting spots are the grain fields, large meadows and lake shores, and sagebrush if it isn't too dense.

After some time had passed, Giles spotted motion off to the right. Ballantine pulled the plane around and then . . . sure enough . . . there on the ground below . . . a coyote.

Many coyotes will head in a fairly straight line, but others are smart, especially if they've had previous experience with sky-shooters. Sometimes they hide and refuse to be burned out of shelter; and at other times they stand and face the oncoming plane. One coyote went so far as to snap at the plane, ready to fight it off.

After studying the ground and deciding which direction would be the animal's path of escape, Ballantine started his run-in from an altitude of only 40 or 50 feet above the fleeing coyote. Giles, his gunner, armed with a 12-gauge shotgun loaded with B-B shot, nosed the rifle out the left window. Aiming while at the same time holding the rifle against the plane's slipstream is not easy. Too, the gunner has to remember that that one shot which must kill the coyote might also hit a wing strut or the prop. And hitting either of those two parts of an airplane is not "standard operating procedure" for coyote hunting. With a bead on the swiftly running animal, Giles pulled the trigger. It was a perfect hit . . . over and over tumbled the coyote, carried for many feet by his own momentum.

Ballantine pulled the plane up, then circled the vicinity for others that might be part of the same pack. But there were none in sight. Apparently this fellow had been a lone wolf this trip. But there'd be others in some other spot, so Ballantine and Giles flew on in further quest.

SPECIAL 12-GAUGE shotgun shells loaded with BB shot are furnished the sky hunters by Oregon State Game Commission. Pilot Ballantine displays day's kill of 13 pelts

Pilot Ballantine and Gunner Giles have answered innumerable questions, both concerning flying and shooting coyotes from the air, when they stop to consult ranchers regarding coyote losses and possible concentrations of the predators. Invariably, they have found the ranchers friendly and interested and the ranchers' wives eager to serve them cake and coffee.

The idea of aerial hunting was started because the coyote situation was becoming increasingly serious. Even in peacetime the coyotes were able to hold their own; and when war came, bringing shortage of ammunition and trappers, they began to forsake their usual winter habits of roaming isolated sections and started attacking game herds, wild fowl and livestock. Oregon stockmen complained of severe losses and the Commission became alarmed at the forays reported to it.

Three years ago (in 1944) in Harney County, Pilot Roe Davis and his brother, Oscar, took up aerial coyote shooting for the bounty and pelt value, then a total of $10 or $12. As they learned the game, they found that often they could bag 15 coyotes in three or four hours' flying. Harney County ranchers, at first skeptical, looked upon this local sky hunting as an expensive sport. But they soon learned differently and they now hire Davis to kill coyotes attacking their herds, reporting concentrations to him.

Roe Davis' good results did much to influence the Commission to carry on sky hunting on a large scale. First objection was that the cost of airplane hunting seemed high —$12.50 per hour for plane, pilot and gunner. But when the Commission figured how much territory could be covered in a few hours by air, it developed that one man-hour with a plane was worth many on the ground. Records showed that three or four coyotes per hour was an average kill, and there was the added advantage that the light aircraft could speedily and easily reach areas inaccessible by road.

Consequently, the plan was set up on a large scale for February and March. This is the best time of the year to find coyotes in bunches because it is their mating season, when they roam about in groups of from two to five or six.

Meyers, who occasionally flew as gunner on aerial hunting missions, can tell many incidents of his trips. Once he saw eight coyotes pursuing a band of antelope. In less than 10 minutes, five of them were dead—three escaped, but so did the antelope. Another time the sky hunters came upon three coyotes which had cornered a calf. Regardless of its mother's frantic efforts, the calf soon would have been veal chops had not its aerial help arrived. Instead the three coyotes became three pelts.

The plane trips mean danger to the coyotes, but there is risk for the hunters, too, even with the air fairly smooth. It's a ticklish business, low-altitude flying,—slipping until the plane is a stone's throw from the ground, then following the path of a coyote. All the while the pilot must be alert for downdrafts and obstructions; and so the policy is that when a coyote is found in a dangerous spot, let him live longer; and the pilot will, too.

The airplane is not the complete answer to coyote control, by any measure; but it is a definite means toward the end. When it is used in cooperation and in a planned program with trappers, it is very effective. The fact that the game commission has resumed its hunt this winter leads us to believe airplanes will play an important part in Oregon's predator control program. Although figures are not complete, results already have exceeded expectations, as many as 47 coyotes being bagged in a few hours' hunting in a single day.

Oregon's sky hunting has been watched with interest by sportsmen and game commissions in other western states, as well as by stockmen. The project definitely shows indications of developing into a large plan for effective control of predatory animals throughout the West.

Washington News

(*Continued from page 6*)

ndustry he aided are mourning his loss, which will become even more noticeable as ime goes on. Senator Hugh Mitchell of Washington, had shown all the evidences of eal leadership and broad vision for the charting of the Eagle's future course in his National Air Policy Board Bill. This was another of the vital measures which was swamped in the last minute confusion of the ast Horse and Buggy Session. Next month, we'll try to give you some estimate of what the new Congress is going to do about keeping America on the wing.

A Seven-Year Deal

In a recent speech, delivered in Chicago by Charles B. Donaldson, CAA Assistant Administrator for Airports, following the series of open hearings held in Washington on administration of the Federal Airport Bill, Mr. Donaldson reminded his listeners that today only about one out of four U.S. communities has an airport; that even if your town does have one, you suffer from the fact that surrounding communities are without landing facilities, reducing the volume of out-of-city trade which could be attracted to your city and airport. While, at the moment of going to press, CAA has not yet finished revision of its plans for allocation of the funds, it readily can be understood that the $45,000,000 appropriated for the program this year will take care of only a small portion. Initiative still must come from local government units.

High Wing

(*Continued from page 57*)

With good windows all around and a roof-panel window, the visibility above and behind is more than adequate for safety and pleasure. The better visibility below gives added safety from aircraft beneath you and behind you in the dangerous "blind spot."

The student who learns to fly in a high-wing model seems to have less trouble getting used to flying. Several have expressed the feeling of "falling out of a low-wing" when they first fly in one after having flown in a high-wing. For this reason and the sense of security the student feels in a high-wing, instruction progresses better in this type.

Aerodynamically, there's better stability in a high-wing due to the "pendulum effect" of the fuselage being beneath the airfoil, resulting in easier, safer flying for the beginner. Slips, for example, may be done without the fuselage blanketing the higher wing, resulting in an opposite slip and a possible spin.

The canopies of most civilian low-wings, where appearance means sales, are so lowered by an attempt at sleek streamlining, that there is seldom really adequate head room for freedom of motion and ventilation. Military trainers of the low-wing type DO have adequate head room for better visibility and to permit rugged cabane struts being incorporated for safety, but in the main, the civilian low-wings are apt to be longer on appearance and shorter on head room.

Low-wings have their advantages, according to those who prefer them, but as for me, no thanks, I'll take a high-wing.

Low Wing

(*Continued from page 57*)

strut supported high-wing types. Since the ship (low-wing) is generally more efficient, aerodynamically, and has less drag it follows that speed will be greater, fuel consumption less, and therefore the cost of operation less per given weight and engine horsepower as compared to a high-wing ship.

Less effort is necessary to control low-wing types, and though possibly slightly less stable than the high-wing, they are much more maneuverable. With good engineering, low-wings can be designed to be spin-proof without sacrificing performance.

Noses slanted down at an angle give the pilot an over-the-nose view better than that over the hood of an automobile. This is important since a large proportion of aviation accidents occur in taxiing or in landing, where poor visibility is a large contributing factor.

Having spotted an approaching enemy fighter many times by means of a strategically mounted mirror, I strongly recommend the use of this device to eliminate blind or awkward spots on ANY aircraft. The low-wing aircraft is particularly suited for the incorporation of a "rear view mirror" by its very design. The glare of the low-wings, often mentioned as a drawback to this design, may be eliminated by using shaded or tinted canopies and by coating glaring metal (such as the wings) with paint of a dull finish.

All in all, and having flown many types of aircraft of both high and low wing design, my preference runs to the low-wing.

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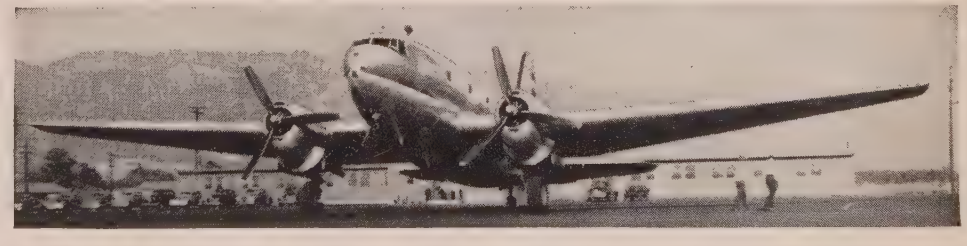

★ Has had 30 hours test and delivery flights plus 14 hours test flights after NC

This airplane was the third to last built by Curtiss-Wright at their St. Louis plant. Cruising speed (50% of power at 5000 feet), 210-215 mph. Empty weight 29,000 lbs.; allowable gross, 45,000 lbs.; useful load, 16,000 lbs. Available at once, together with two spare engines, each used only five hours. Engines crated and pickled, each having the following: Starter, generator, G.E. magnetos, moisture-proof ignition harness, fuel and vacuum pumps, and propeller governor.

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New approach needed

Dilbert

(*Continued from page 55*)

A $750,000 Jerk—Did you read what happened recently to a U.S. passenger plane just after completing a flight from New York to Ireland? When the pilot ordered, "Flaps up," while taxiing to the terminal, the co-pilot snappily complied. Only he jerked the wrong lever and the wheels came up instead. This dropped the transport to the runway where it was damaged beyond repair.

Nothing will excuse this Dilbert for his cockpit ignorance, but there is another angle to this accident which I want to bring out. This was not an inexperienced co-pilot. The trouble was that most of his experience had been in another model, a transport in which the flap lever was located where the wheel lever was in this one. Thus his reflexes were trained and conditioned for a certain reaction in one airplane while the identical reaction in another model caused a $750,000 crash. Asinine, isn't it? That's what you call a built-in accident.

Nor was this an isolated case. There have been many similar tragic reactions and they will continue until the cause is removed, until cockpits are standardized. I know from experience that isn't as easy as it sounds, but it can be done. Proof of this is that it already has been done once. The arrangement of basic cockpit instruments and controls has been standardized for future construction of most military models.

This major landmark should simplify standardization in future commercial designs. Since the majority of commercial pilots are ex-Service aviators, the military standard should be accepted. Once the vital need for it is recognized, standardization will be easy. It merely requires some intelligent cooperation between manufacturers and operators, with judicious guidance and perhaps a bit of pressure from CAA. Note I'm not referring to existing models, but only to *future* designs. It is bound to be a requirement, eventually. Since it will be such a boon to every one in aviation, let's do it NOW.

A New Approach Needed—Dilbert was returning to the field after his third solo. He was so intent on figuring out just what he was going to do to make his landing perfect that he was in his approach glide before he noticed the plane ahead of him had stalled on the runway. No, he didn't run into it. He immediately gave it the gun, but instead of going around again he tried to land on the last half of the runway.

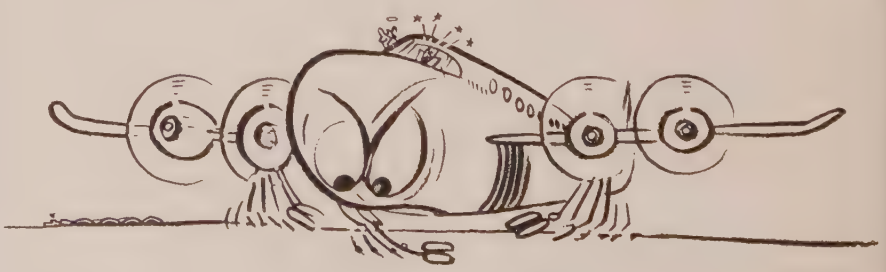
By the time he made contact, he realized he was running out of runway. Fortunately, he didn't try to take off again at this point. As it was, all he needed was a new airplane when he ricocheted off the boundary fence.

I can't say definitely that this young tyro was too proud to go around again when he found the runway obstructed. Maybe he had a one-track mind and once it was committed to a landing, he was unable to change it. I do know, however, that pride has been the downfall of many a more experienced pilot under similar circumstances.

I once had an instructor who helped me over this hump. He used to say, "It takes a good pilot to go around again."

Watch that Ceiling—When on a cross-country hop with good visibility gradually running out on you, you may find yourself in a mist, then in a fog. Don't get into a mental fog and make a Dilbert-like decision to climb above fog and clouds. With no visibility ahead, for all you know there's a hill in the way. The way to avoid this sort of jam, whether you're new at the game or an old hand, is to keep lowering the altitude of your plane *with the ceiling*. If the ceiling drops below 500 feet, you'd better land.

Two Ways To Learn—Long before the first airplane, Confucius said, "A wise man learns from his own experience; a wiser man learns from the experience of others".



$750,000 jerk

PROP WASH

Aero Oddities

Ground Air Travel. Continental Air Lines' chief telephone operator at the Denver airport has 1,000 hours travel time in an airliner, but she's never been off the ground. Three times a week Continental's planes are moved up to the air terminal from the company hangar, a mile away. Miss Telephone Operator has ridden these lunch-time trips for three years.

Boomerang. Salem (Ill.) Rotarian George Lytle playfully kidnapped the Lion's Club mascot, a goat. Took it for a ride in his plane. Returned it in a hurry when it started chewing on plane's fabric.

Biggest Pilot. Farmer William Roberts of Arena, Wisconsin, claims he's biggest pilot in this country. Weighs 275 pounds. Douglas Corrigan taught him 10 years ago.

Stork Club. Twenty-five passengers boarded an airliner to fly non-stop from Greece to Italy. Twenty-six got out. A Greek woman gave birth en route, with plane's navigator helping with the delivery.

Flying Horse. Trigger, movieland's Roy Roger's horse, goes by air now. Insured for $125,000, Trigger usually flies around in a chartered DC-3.

Flying Milkman. An army officer in Rio de Janeiro had a yen for real American milk. A request to a Miami dairy now produces a gallon of Grade A pasteurized moo-juice via plane twice weekly.

Horsie 'Copter. Let there be no doubt as to which nag won the race. The judges at New Hampshire's race track, Rockingham Park, now follow the horses around the oval, thanks to a helicopter. Fortunately for the bettors, the horses so far don't seem to mind being shadowed by the flying machine.

Flying Farmers. William E. Vulgamott and Oliver R. Bowers procured a plane and some tools, proceeded to set themselves up in business. When a farmer phones in that a tractor is acting up, the two men hop in the plane, land in a field near the machinery, fix it. Says Bowers, "Two or three trips can be made by plane in the same time it would take to make one by car . . . and I like giving the farmer's family a thrill by landing near the ole homestead."

They Say. Plane props are so delicately balanced that a cigarette paper laid on a blade will cause 1,000-pound prop to revolve on its testing axle.

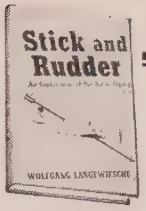
High Stakes. Airmen Duke Wiley and Eddie Alias, Las Vegas, Nevada, are negotiating for purchase of a surplus B-17 which they will convert to an aerial gambling ship. It will fly between Reno and Las Vegas.

Open Wide Please. A snow-bound Minnesota farm woman, suffering a bad toothache, phoned her pilot-dentist, Dr. A. J. Hanson. He flew out to farm, landed on ice-covered lake, fixed the tooth, took off and was back at work in his office in a little over an hour.

Things to Come. B. K. Douglas had to deliver some ice cream to Otto, Wyoming. He took off, landed plane on highway west of town, taxied in, parked his plane in front of the post office, delivered the ice cream, still solid.

Att'n Readers

PROP WASH is your column. If you have any news-note oddities pertaining to aviation, send them to SKYWAYS, *Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed on Prop Wash page. In cases of duplication, the Prop Wash contribution first received at the office of the editor will be honored. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.*



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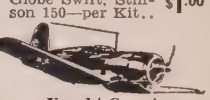

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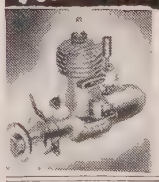

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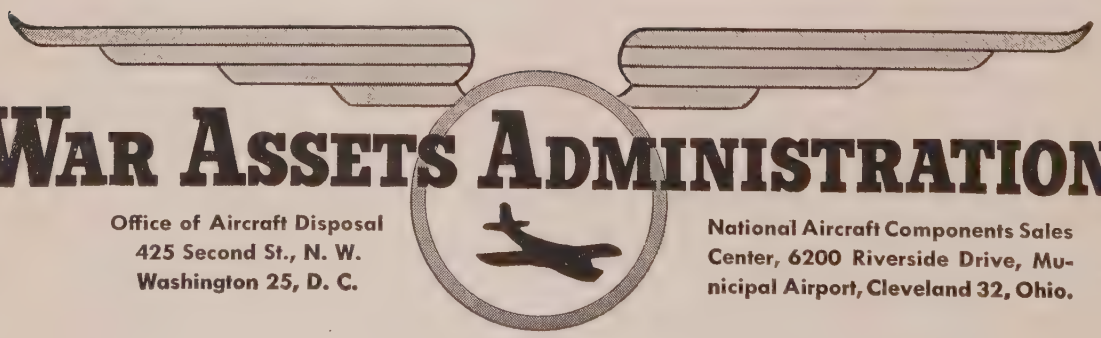

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Aero-Lighthouse Keepers

(*Continued from page 58*)

Started in 1923, the beacons now stretch along the country's airways from the mountains of Alaska, down through the below-sea-level conditions of Death Valley, all the way south to tiny, lonely little Swan Island in the Gulf of Mexico, southernmost outpost of our marked airways.

The structures vary between 51 and 105 feet in height and their design is altered to meet the needs of different locations. In the heavy snow regions, for example, a double glass arrangement protects the wires from the possibility of being short-circuited from melting snow.

Beacons were constructed the world over during the war. Maintenance men who worked overseas returned with a legion of stories concerning the placing of beacons in remote places. Natives in Africa, they reported, were either amazed or terrified by the complexity of the beacons, particularly those employing radio in addition to lights. In some countries, however, natives were so interested in the projects that they pitched in in great numbers to help with construction. Tribal chiefs would make it an occasion for celebration and bring their families and livestock along.

The maintenance men are also helping now with the construction of the 500 Very High Frequency radio navigation towers along the airways. Forty of them so far have been erected, and the route from Los Angeles to Amarillo is actually in operation. Mushroom-like affairs, 30 feet high, with a large circular grid on top, 35 feet in diameter, they must be spaced on an average of 90 miles apart.

As VHF will not penetrate obstructions or bend with the curvature of the earth, the towers must be of the line-of-sight variety. They must be placed at such height as to allow nothing to interfere with the radio wave before it is joined by that from the next tower.

Hence, many engineering problems are presented. On a western mountain, for example, a tower originally started at the 4,000-foot level has to be moved 3,000 feet higher to avoid other distant peaks.

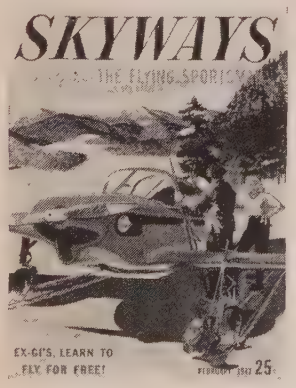
But VHF won't challenge the permanence of old flashing lights any more than the conventional radio ranges have. As long as human nature is such that a flashing light is more reassuring than the impersonal reading on an instrument panel or a dit-da in the earphones, beacon lights will play their part in airways navigation.

And the man with the tool-kit and back pack will be plowing through snow drifts and sweating it out over desert trails, playing his part too, to keep 'em lighted.

READ "Anglers Holiday at Guaymas"

On the east shore of the Gulf of California lies a fisherman's paradise, Guaymas. Here holiday anglers catch striped marlin, swordfish, bass in the daytime, while at night they enjoy gay fiesta time.

***in* MARCH ISSUE**



SKYWAYS PICTURE CREDITS

COVER—This two-place low-winger is the Globe Aircraft Company *Swift*, powered by the 125-hp Continental engine. Though not certificated for skis as we go to press, we don't think *Swift* owners will want to go through the winter missing this extra utility. New, the *Swift* is its aluminum all-metal self—painted like this the plane is about 10 pounds heavier. Auto paint standards plus spray gun assure extra-life to a plane. The otherwise retractable gear on the *Swift* remains fixed when skis are attached. Designated the *Swift* GC1B, it has a cruising speed of 140 mph; its 30-gallon fuel capacity assures 450-mile range.

The following list gives source of each picture used in this issue of SKYWAYS

12—AVRO AIRCRAFT; 14—JOHN E. KALINA; 16—K. D. SWAN COURTESY US-DEPT. OF AGRICULTURE FOREST SERVICE; 17—ROSS MADDEN FROM WESTERN WAYS; 18, 19—MARTIN & KELMAN; 20—METROPOLITAN PICTURE SERVICE, HOWARD LEVY; 22—BRITISH COMBINE; 24, 25, 26—MARTIN & KELMAN; 27—LOMAC (WATCH, COURTESY TOURNEAU); 28, 29, 30—DON DOWNIE; 31—MARTIN & KELMAN, INTERNATIONAL NEWS PHOTOS; 33—WIDE WORLD; 34, 35, 36, 37—DON DOWNIE; 38, 39—CERBER, RUDY ARNOLD; 40, 41—BARRY KRAMER; 43—RUDY ARNOLD; 44—BRITISH COMBINE; 45—MARTIN & KELMAN; 46, 47, 48—BOB ARENZ; 49—CALL AIRCRAFT CO.; 50, 51, 52—VERNON GILES FROM WESTERN WAYS; 53—AERONCA; 56—USN, SIKORSKY, ARMSTRONG-WHITWORTH, A. U. SCHMIDT; 57—C. B. COLBY; 58—CAA; 60, 61—USAAF; 62—THE AEROPLANE FROM BRITISH COMBINE; 64—METROPOLITAN PHOTO SERVICE; 72—GLENN L. MARTIN CO.; 77—USAAF, BELL; 86—VERNON GILES FROM WESTERN WAYS; 93—BRITISH COMBINE.

ALL USN, USAAF, AND CAA PHOTOS ARE OFFICIAL.

Seven-League Boots

(*Continued from page 61*)

the big Lycoming job probably can be nursed along to 5,500 to 6,000 hp before a newer development makes it obsolete.

Development of the 36-cylinder Lycoming giant is a good example of the length of time it takes to develop as complicated a piece of machinery as a multi-cylinder reciprocating aircraft engine, which has to be as light, strong, powerful and reliable as is humanly possible. In 1932, like Germany and England, the U. S. Army Air Corps wanted an inline liquid-cooled engine for its "pursuit" planes. Development work was begun on the Allison, and Lycoming was brought into the picture for a separate project. By 1934 a single-cylinder liquid-cooled engine was operating and two years later completed the 50-hour endurance test. By the end of 1937 the 12-cylinder XO-1230 (1,233-cubic inch displacement) was ready for its endurance test, rated at 1,200 hp for take-off, and 1,000 hp for normal operation. In July 1940 a two-row version of this, the 24-cylinder H-shaped XH-2470 (2,400/2,000 hp) was bench-tested and later flight-tested in the Vultee XP-54 with a pusher prop.

In 1943 Wright Field Power Plant and Lycoming engineers started talking about a really big engine for long-range operation. The idea was to have a large displacement to horsepower ratio (and this is, 7,755 cubic inches to 5,000 hp) in order to utilize the economic effects of high-compression ratio and also require low boost for ground operation. This was more than three times the size of the XH-2470 and a lot of work was required. For one thing Lycoming's experimental laboratory had more or less "grown up" along with the engine, and the need for a new and more modern building was apparent. A start in this direction had been made when a large test stand was built in 1940 for the XH-2470, which was twice as large as its predecessor; with the possibility of future developments in mind this test stand was so constructed that it was capable of accommodating engines in excess of 5,000 hp. However, when the big X-7 project really jelled, plans for a brand new laboratory were drawn up and construction started in August of 1943. At the time of unveiling the big engine, the press was also shown through the new laboratory, which incorporates the latest and most scientific equipment now available for the testing of internal combustion reciprocating engines and their components. Facilities are available for the testing of engines from the 65-hp flat-four for lightplanes up to engines in excess of 7,000 hp. This latter figure may mean that a still larger version is in the works, or more likely that by the use of better alloys and clever internal refinements for which the piston engineers are noted, the horsepower per cylinder of the XR-7755 will be souped up from the present 140 to nearly 200. That this is not impossible is indicated in the figures announced for the latest Rolls Royce *Griffon*, which with 12 cylinders has a rating of 2,400 hp for take-off.

Coming back to the engine itself, the big X-7 development was pushed along and it was ready for tests in July, 1946, the end result of 14 years' development. Flight tests in the B-36 within a few months will start it off on a new stage of its long career.

Sports News

(*Continued from page 53*)

Footnotes For Sportsmen

Sore feet, damp shoes, cold toes, can spoil a hunting trip more quickly than scarce game. You will get more enjoyment out of your trip if you go prepared.

Plain castor oil, if the children don't mind, makes an excellent waterproof boot oil. Inside the boots, remember that two pairs of light socks are warmer than one pair of heavy ones. If fear of blisters loads you down with adhesive and salve, just prevent them by rubbing the spot of friction with dry soap.

But in spite of precautions, boots do get wet, and leaks appear. To dry them, heat gravel small stones, or any old thing in a skillet, then pour it into the boot. For repairing leaks carry a bicycle tube patch outfit.

Easy To Enter Canada

Their eye on the plush US tourist trade, Canada makes entry easy for Americans wishing to fly to a favorite hunting or fishing spot in the Dominion.

The aircraft should land at a Customs Airport, where it will be cleared with a minimum of red tape. It is necessary to advise Custom's officers in advance of the pilot's intent to land, and to receive an acknowledgment. The importance of this can be understood by any pilot who has had to detour from a course because of weather; if a forced landing is necessary, your reply from the Custom's officer will clear any suspicions your sudden drop out of the sky might arouse. No passport is necessary to enter Canada, but it is wise to carry some sort of identification.

The hunter may bring in firearms on the proper permit; vendors of hunting licenses can issue such permits. No automatics are allowed. Hunting dogs may be brought in on a certificate signed by a veterinarian stating that the dog is free from contagious disease and has been vaccinated against rabies within the past six months.

Advice On Skis

There are many new skiers this year who had to postpone their first acquaintance with Christianias and Nasensprungs (better look that one up, you "natural" athletes) throughout the war years. These may not know that ski clothes should be light, windproof and water repellant, or that longies are in style under ski pants, or that sweaters as outer garments should be avoided because they absorb snow. Even more important than the clothing are the skis themselves. It's cheaper, in the long run, to get the best equipment at the outset, and then to care for it properly.

Care means, in this instance, wax. Different kinds of wax are used for every snow condition, and applied thinly or heavily depending on the temperature in which the skis are to be used. There is no wax that is perfect in every snow, nor is there a foolproof waxing chart. It is advisable to choose one or two well-known brands, and get used to these. Otto Schniebs, ski expert, says that Victor Sohm's wax is the most reliable. He also recommends Duro-Speed, a liquid wax, which will prevent warping, and stays on for weeks. All good waxes carry clear, concise directions for application.

Fly For Free

(*Continued from page 62*)

Board of Education. A check with other parts of the country indicates that the figures are fairly typical.

Private Pilot's Flight Course. 35 to 46 hours, $499.25. This course makes you a private flyer within 10 to 15 weeks. A Private Pilot's license enables you to fly your own plane for business or pleasure, take a friend for a flight, but not a passenger for hire.

Commercial Pilot's Flight Course. 160 to 200 hours, $1,800 to $2,274. This course requires about 12 months to complete. Gives an extensive background in all ground school subjects—meteorology, navigation, Civil Air Regulations, general service of aircraft and radio navigation.

Multi-Engine Course, $500. This course gives 11 hours of concentrated dual training in twin-engine aircraft and qualifies you for the CAA twin-engine rating.

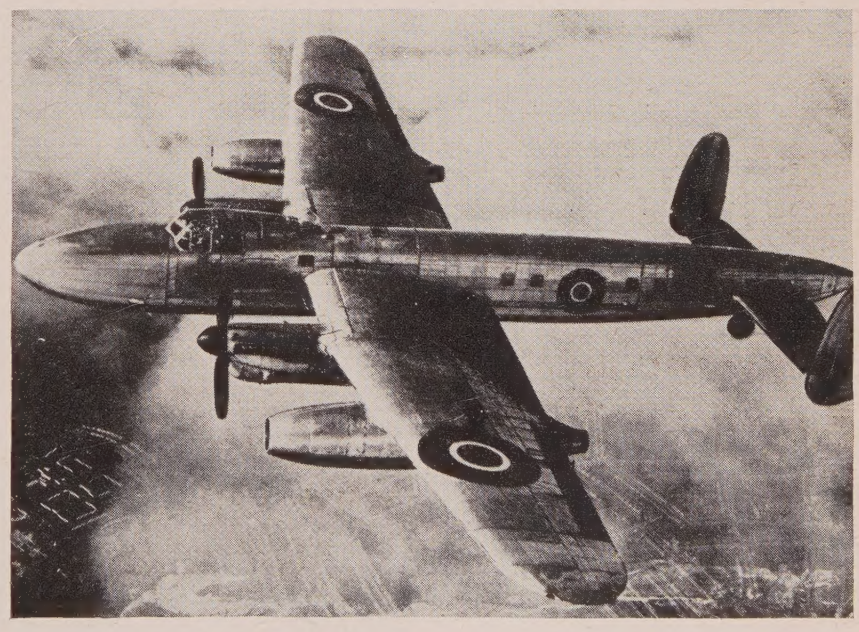
There are two comprehensive non-flight courses. The first is the *Airplane and Engine Mechanic's Course,* 42 weeks, $1,175, with a VA contract price of $800. This course qualifies you for a CAA A & E Mechanic's license, a passport from school into the airline business. Includes the basic principles of aircraft and engine mechanics.

The other is the *Base Operator's Maintenance Course.* This takes from 44 to 48 weeks and costs from $1,269 to $1,398. This course gives three important licenses in less than one year's time, the Airplane Mechanic, Engine Mechanic and Private Pilot's Certificate. Offers a full time training program designed to qualify the graduate for immediate supervision as a base operator. Includes from 35 to 46 hours' flight instruction.

On the west coast, typical rates in the Los Angeles area offering approved GI flight training courses include the Private Pilot's course at W. H. Coffin Air Service, $493.50 (35 hours flying, 120 ground); Commercial Pilot's course, $2,507.61 (160 hours flight, 450 ground); Instrument Rating, $498.60; Flight Instructor, $490.30. The University of So. Calif. College of Aeronautics, eight weeks' course for Private Pilot, $465; Commercial Pilot, $1,781 (includes 110 hours of solo, $970); Flight Instructor, $517.50; Flight Instrument, $621.

It will be noticed that in many cases the courses for Private Pilot, Flight Instructor and Instrument Rating cost about $500 and can be completed in less than a 30 weeks' school year. This falls within the rule that the VA is permitted by law to pay only $500 in tuition and fees during a school year. For the full-length courses of 40 to 52 weeks' duration the VA is allowed to pay more than the $500 normally payable only in one school year, but the veteran is required to give up an equivalent amount of his total educational training time. Thus, if he is entitled to it, he may use up his entire total of $2,000 in one year. This will have an adverse effect on his eligibility for general college education, and unless he is sure that taking a full aviation course is going to lead to employment and a profitable life vocation it will be well to consider the matter carefully from every point of view.

It is with this in mind that officials of the Veterans Administration, Washington, are suggesting that in many cases it will be advisable for veterans to defer their flight training until they have completed other general college courses which may better help them to cope with life. After that, the more young men and women we have who have the Private Pilot's Certificate the better, and Uncle Sam stands ready to help them put it under their belts.



Britain's *Nene-Lancastrian*

Primary purpose of using *Nene* turbojets as outboard engines of the A. V. Roe & Co.'s *Lancastrian* is to provide flying test bed for the jet units. Cruising on the *Nenes* alone produces flight so quiet that engines of planes overtaken can be heard easily.

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ERCOUPE 1946: Starter and generator. 45 total hours; never scratched. $2975.00. M. Carmichael, 4506 Lawnview Rd., Pittsburgh 27, Pa.

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1946 PIPER SEAPLANE, J-3065 Special, only six months old. 480 hours on plane, no time on engine since top overhaul. Navigation lights, intercom system, emergency equipment. Wheels with brand new tires included. New propeller. Plane in perfect condition, ready to go. Will deliver anywhere in U. S. for expenses. Wire your offer. Wolverine Air Service, Comstock Park, Mich.

SPARTON EXECUTIVE, 450 h.p. P & W Wasp Jr. Excellent condition; equipped with full set of instruments, 2-way radio and Lear ADF. AiResearch Manufacturing Co., 9851 Sepulveda Blvd., Los Angeles 45, Calif.

TAYLOR CRAFT A40—Just relicensed and exceptionally good. $895. French Aero Service, Washington C. H., Ohio.

NEW TAYLORCRAFT BC 12-D-Wing tank. Hangar available, $2,500.00; down, $850.00. Hicksville Airpark, Hicksville, L. I.

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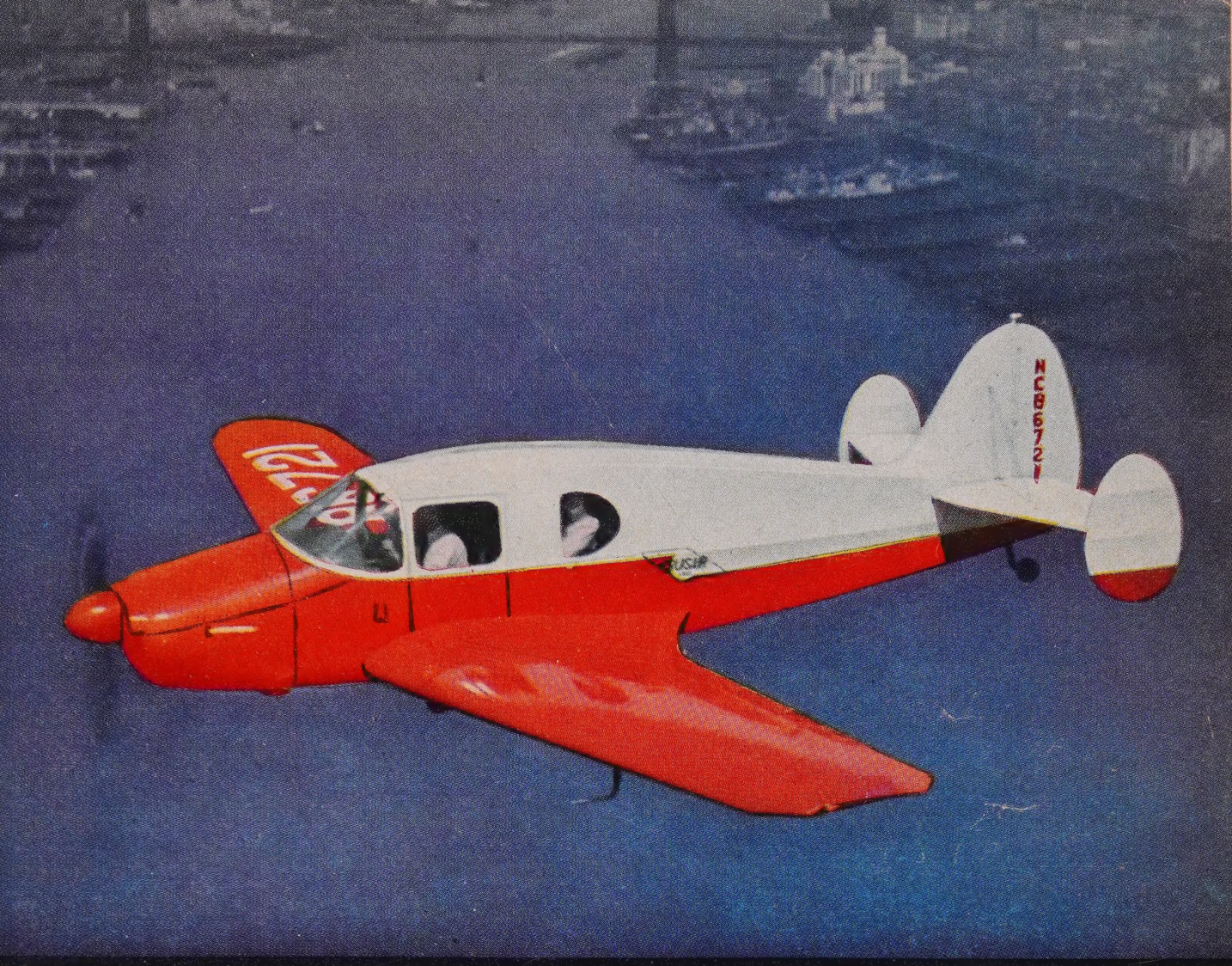

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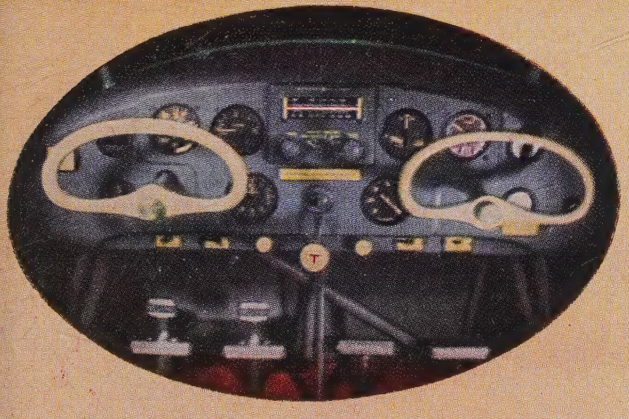

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